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To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interests of Lake Carriers, and improve the character of the service rendered to the public.

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INCREASE OF THE NAVY.

The question of increase for the Navy is now the all absorbing topic at the Navy Department, and from the present outlook it is apparent that it is the intention this year to promote the efficiency of the Navy along lines totally different from those of the past. In view of the great ship-building program of the German Empire and the increasing commercial rivalry of the two countries, officers of the Navy in high standing with the department are advocating a plan of increase for our Navy commensurate with that of the German Emperor. The principal advocate of such a plan is the Bureau of Construction and Repair, which is urging upon the department the necessity of immediately constructing several protected cruiser of a type radically different from anything in this class now in the Navy. These ships are to be especially constructed to cope with the fast ocean liners of the Deutschland class; will have a speed of not less than 24 knots and a coal capacity much greater than has been the custom. The Bureau is also in favor of the construction of additional battleships of the most modern description and armored cruisers such as were authorized during the last session of Congress. In fact, the Chief of the Bureau firmly believes augmentation along the most advanced lines of warship construction.

A project looking to the construction of what will be termed "fleet colliers" has also been proposed to the Board on Construction. These vessels, to be used for carrying coal for a fleet, are to be both armed and armored and will be able to hold their own in any general engagement. Besides an enormous quantity of coal the fleet colliers will always have on hand additional ammunition and other stores. They will be fitted with apparatus for coaling at sea and also with towing lines to assist any vessels which may become disabled. From all points of view the fleet collier will be a great addition to the Navy and will add materially to the efficiency of a fleet.

As stated in the Army and Navy Journal, many officers of the Navy are in favor of an increase confined in the immediate future to the construction of small gunboats especially adapted for service in the waters of the Philippine Islands, China and South America. It is pointed out that with the ships now under construction and authorized the shipbuilding concerns will be filled for the next few years. No great weight is placed in this argument by the Bureau of Construction, the members of which are firmly convinced that with the increase in demand there will be

a corresponding expansion in the capabilities of the country. Rear Admiral Hichborn is also in favor of having a certain number of vessels built each year at the various navy yards, and in this connection he has recently made a strong argument in his annual report.

Much of this, however, is speculation, as nothing will be definitely decided prior to the return of the Secretary of the Navy after the election. It may be seen in a consideration of this subject that there are two plans for the increase in the navy, which are different in every essential. Naturally, much will depend upon the recommendations made by the Secretary in his annual report. We have always favored increasing the navy commensurately with the many additional duties which have devolved upon it and whether it be in battleships, cruisers, colliers or in gunboats, we feel assured the action of the Navy Department will be for the best interests of the navy and the country at large. An increase of the personnel is equally important and in his annual report General Heywood makes a strong argument for a corresponding increase of the Marine Corps.—Army and Navy Journal.

BRITISH PACIFIC CABLE.

The specifications for the new British submarine cables in the Pacific have just been published. They call for the construction of more than 8,000 miles of cable to connect the British colonies of Canada, Australia and New Zealand.

Owing to the fact that there is no British territory between Canada and the equator in the eastern portion of the Pacific, an uninterrupted stretch of cable is to be laid between Vancouver and Fanning Island, a distance of 3,200 miles, which, allowing the customary 14 per cent. excess for inequalities, etc., will make an unbroken cable of about 3,600 miles necessary.

The new cables will consist of one central copper wire surrounded by a spiral of smaller wires. The latter are wound spirally; as they are much less likely to rupture during special strains when applied in this way, and in case of the breaking of the central wire the electrical continuity of the line is preserved through the smaller spirally wound circuits. This last edition will bring the world's total of submarine cables up to 183,000 miles.

DAMAGE SUITS FILED.

Two damage suits over steamboat collisions were filed in the United States court at Detroit, Monday. One is the mix-up between the steamers James Watt and Maruba and the barge Manda which took place near Grassy Island, in the Detroit river on July 28 last. The second is the sinking of the barge Martha in Detroit river, by the steamer E. P. Wilbur. In the former case the James Watt is sued by the owners of the Maruba and Manda for \$16,400, the amount of damage done to the two boats. In this case the steamer Tacoma also figured, but it is not thought she was at fault. The Watt attempted to pass the Tacoma, both being bound in the same direction, and the latter boat sheered, striking the Watt on the stern, causing the Watt to collide with the Maruba and consort, bound in the opposite direction. It is charged that the Watt is at fault, inasmuch as she attempted to pass the Tacoma in a crowded narrow channel.

In the Martha case the steamers Troy and Wilbur are both sued, the owners of the Martha claiming that the Wilbur had reckless and incompetent officers and was going too fast for the crowded condition of the river. The Troy is blamed for drawing the Wilbur from her course and in not giving her room to pass the Martha in. The amount of damages in this case is not known, as the Martha is not yet repaired.

HARNESSING THE ST. LAWRENCE.

The Massena plant of the St. Lawrence Power Co. has been fitted out with electrical apparatus by the Westinghouse Electric and Mfg. Co. Machines to generate 75,000 horse-power have been made in East Pittsburg. The enormous capacity of the Massena plant is best understood by comparison with that of Niagara Falls. During the last five years, ten 5,000 horse-power Westinghouse generators, making a grand total of 50,000 horse-power, have been installed at Niagara. The station at Massena will contain fifteen 5,000 horse-power generators.

The natural conditions at Massena are said to be among the most favorable in the world. The volume of water in the St. Lawrence is enormous. It undergoes a fall of fifty feet at the Long Sault Rapids. A canal has been cut through some miles of level country above the falls and it is said that sufficient water will be brought through to develop 150,000 horse-power. A power house is being built on the bed rock of the Grass river. It will be 700 feet long and 150 wide. Turbines will be placed on horizontal shafts in sets of three each. Two turbines of each set will be sufficient to operate one of the big generators, allowing any one of the three to be cut out without interfering with the work of the other two. Each of the main generators will weigh 175 tons, stand 22 feet above their foundations, and cover a floor space of 22x18 feet. According to a correspondent of the Pittsburg Dispatch, the plan for controlling the great power of the St. Lawrence is simple. One man will do it by a series of electric buttons arranged on a small table. The touch of one will direct a power equal to that used by the three largest steamships in the world. The table will be placed on a stand raised some feet above the floor of the power house and in the center of it. Every group of indicating instruments is in plain sight and the operator has under his eye at every movement the fifteen big generators.

DANGER IN INCANDESCENT LIGHTS.

Capt. A. B. Drake, manager of the Inland Lloyds Vessel Register, is at work on the problem of damage to grain cargoes by incandescent lights. He still finds that vessel owners are not agreed to the claim of insurance agents that these lights will set grain on fire, an idea that they would drop very soon, no doubt, if the underwriters should refuse to pay for such damages. Capt. Drake took some oats and immersed an incandescent light in them. He found that it took twelve minutes for the grain that touched the glass to begin to turn brown and give off an odor. He then put on the globe that is sometime used over the light and found that it took four hours to do the same thing. An investigation of the damage done to the cargo of the steamer Chili this season shows that such slow fires will make their way to the bottom of the cargo and also injure all the grain in the compartment. The plates of the Chili were warped where the fire reached them, and a frame or two bent. Had she been of wood she would have taken fire.

TURKISH PURCHASE OF WAR VESSELS.

The consul-general at Constantinople, Mr. Dickinson, writes from Binghamton, N. Y., August 28, 1900:

I am informed by the manager of the exposition of American goods recently opened in Constantinople that by an imperial irade the Turkish Government has just placed an order for six cruisers with the German shipbuilding yards at Kiel, and that the Minister of Marine signed, on the 10th instant, a contract for two torpedo boats of the newest pattern, which are nearly completed in the Ansaldo shipbuilding yards at Genoa. It is reported that these torpedo boats will be delivered in Constantinople in about four months from August 1.



CHICAGO.

Special Correspondence to The Marine Record.

While lying at the Rock Island dock Monday night the steamer Saranac was struck by the Arthur Orr, which was going down the river, and had seven or eight stanchions badly bent.

Grain freights showed no life on Wednesday and rates held between $1\frac{1}{4}$ and $1\frac{3}{8}$ cents on corn to Lake Erie. To Georgian Bay there was some demand but vesselmen generally were not disposed to go there at what is offered. Shipments for the first half of November will be the lightest of the season.

Legal process has been procured against J. H. Sheadle, of Cleveland, owning the steamer Choctaw, which damaged the Canal street bridge so badly several days ago that it was temporarily put out of service. The amount of the damages is about \$9,000. Bridge Engineer Wilmann has a gang of men at work repairing the bridge for the winter travel. The company will be obliged to settle the bill for repairs made by the city.

The Milwaukee Forge & Iron Co., recently formed with a capital stock of \$300,000, has completed its organization. Fred. C. Starke, formerly of the Sheriffs Mfg. Co., has been elected president. The company will manufacture steam-boat shafts and piston rods, dredging machinery and heavy forgings for machine work. Plans have been made for the new plant the company will build, and work will be started as soon as possible.

It is stated this week that if vessel owners are to depend upon the Chicago grain trade to keep their boats going they might as well prepare to lay up a good part of the fleet. The call for vessels was extremely limited, and not much could be done. Rates were nominally $1\frac{3}{8}$ cents on corn. Buffalo brokers give no hope of a better movement in hard coal before November 15. They say they will have difficulty in providing vessels, now bound down, with return cargoes, except they wait for them.

The excursion steamer Minnie B has been fitted up by her owner, Capt. Louis Hohmann, to go down the canal and Illinois and Mississippi rivers to New Orleans, making the third boat to leave for the gulf in many weeks. Capt. Hohmann is accompanied by his wife and Frank Hohmann and wife, of New York. At New Orleans the boat will be sold and the party will return by rail. The Minnie B is the largest boat that has attempted the trip. By placing the fuel forward a draft of five feet will be obtained, and rivermen think she can get through with that.

It is said that a charter to take wheat to Buffalo was made at $1\frac{3}{8}$ ¢ on Monday. This is a drop of $\frac{1}{8}$ ¢ from the old rates and may indicate a decline in the corn rate to $1\frac{1}{4}$ ¢ to-morrow. A vessel broker states: "There will not be much done in grain freights until the new corn crop begins to arrive. The premium of $\frac{3}{8}$ ¢ on corn in October over November brought out every bushel that could be shipped at that time. The advance in rail rates from Lake Erie to the seaboard of 2¢ a bushel, which went into effect November 1, added to the premium on October corn, made a difference of $\frac{5}{8}$ ¢ a bushel. When this is taken into account it is easy to see why receipts of corn at Chicago have fallen to so low a figure this month. Lake rates, it seems to me, from now on will be based on what vesselmen figure they can run their boats at without too big a loss."

It is stated this week that the American Steel & Wire Co. is about to take over the American Steamship Co., a concern organized to own and operate the steel company's ore boats. It is capitalized at \$3,000,000 and most of the stock is owned by principal owners of steel and wire shares. It is understood that the steel company is to pay \$175 a share for the stock of the steamship company, which allows a very handsome profit for the people who organized it. At that price the boat line will cost the steel and wire company \$5,250,000. The officers of the steamship concern are all insiders in steel and wire. John W. Gates is president and John Lambert vice president. The other officers and directors are also connected officially with the big company. The deal looks like putting money from one pocket into the other as the capitalists are the same in each deal.

A test was made in the model tank at the Washington navy yard, Oct. 26, of a model of a new type of torpedo boat. The vessel is a combination of some of the features of the submarine boats and ordinary torpedo craft. All the vitals are below the water line and the small surface of the vessel showing above the water is protected by cellulose. The test was very favorable to the invention, the only objectionable features being the low speed developed, fourteen knots, and a very perceptible wake. There will probably be another test after an attempt has been made to so rearrange the boat as to meet the objections made by the naval experts.

DETROIT.

Special Correspondence to The Marine Record.

The steamer Swallow, brought to Detroit by the wreckers, will probably never be repaired.

The Pere Marquette boats are carrying but little grain this fall, and no material increase in this business is looked for until the close of navigation.

Work on the wreck of the Fontana is progressing rapidly. The wrecking contractor will be able to save some of the equipment of the schooner. It will be possible to save the big steam windlass and gear, valued at about \$800, also the two anchors. It is not known when the work will be completed.

The following report for the period from September 16 to October 15, 1900, inclusive, of vessels passing through the Detroit river, was furnished by courtesy of Postmaster F. B. Dickerson, at Detroit, Mich. Number of vessels passing through during the day, 1,697; during the night, 1,300; total 2,997; for the season, since April 26, 1900, 18,530.

Capt. Davidson has begun laying up his fleet at his Bay City shipyard, the first craft to come being the Bermuda. There are seventeen vessels in the Davidson fleet. Five of these will undergo various repairs during the winter. Several that do not need repairs will be wintered at Chicago. The new steamer known as No. 95 will be launched next Saturday.

Surveyors in the employ of the Minnesota Steamship Co. proceeded, on Monday, to the scene of the Martha collision for the purpose of taking measurements for use in the expected litigation with the Lehigh Valley Line, owners of the steamer E. P. Wilbur, which sent the Martha to the bottom of Lake St. Clair. The case will be one of the most interesting tried on the lakes for a long time.

U. S. government engineers are here taking soundings of this channel for the purpose of reporting to the government the advisability of deepening the channel and using it instead of the Canadian one. The engineers state that as far as they have gone the soundings indicate that it would be much cheaper to deepen the American channel than to finish the work on the Canadian channel, and also that it would make a better course for larger boats. Congressman Henry C. Smith is deserving of great credit for pushing this matter.

The Erie & Western line needs the services of the Wilbur badly just now, and gangs of men are at work night and day replacing her broken and bent plates and frames. Every piece that requires rerolling must be sent to the Wyandotte plant and back again, and every new piece must be shaped and punched and bent down there and sent up to Orleans street. This seems like a strong argument for that big dry-dock that has been built out of paper for so many years. It has been suggested as the most practical plan to construct the dry-dock at Wyandotte. The ground is not suitable for a 500-foot dock near the foot of Orleans street, while there is good land for it below. It is said that a dock big enough to hold the largest and able to quickly repair any kind of boat would bring an immense amount of business to Wyandotte that now goes to other ports.

Warrants have been issued against Capt. May of the schooner Richards, and Capt. Baker of the tug Champion, for alleged violation of the United States statute in leaving the disabled schooner Richards lying in the channel near the lower end of Belle Isle, Detroit river. The warrants have not been served, but the two defendants, with their attorney Fred C. Harvey, have been notified to attend before Commissioner Graves at Detroit. Capt. Baker, it is stated, asked Col. Lydecker's permission to destroy the Richards with dynamite, and Col. Lydecker consented on condition that all the debris be removed. This condition had not been taken into consideration in counting the cost, and the plan had to be abandoned. It was thought by Capt. Baker that the pieces of wreck might be allowed to lie on the bottom, which is quite a distance below the surface at a point near where the wreck now lies.

The Detroit & Cleveland boats have been awarded the contract by the government of carrying the mails between this port and Cleveland. This is probably the first time that United States mail has been carried by boat from Detroit to Cleveland, but it is said to be a great convenience and it is looked upon by the postmasters at Detroit and Cleveland with great favor. W. L. McGinnis, assistant superintendent of railway mail service, stationed at Washington, first conceived the idea of sending the mails by boat from Detroit, and the D. & C. line was subsequently given the contract. The mail which goes by train at 6 p. m. does not carry as much of the business correspondence as will be done by the boats, because many business letters are not posted until after hours and are too late for the train. With the boats, however, this will be different, as they do not go until 10 p. m., thus giving business men a chance to mail their letters and have them delivered at Cleveland early in the morning. All matter mailed up to 9 p. m. will be in time for the Cleveland boat, and much delay will be necessarily avoided. The D. & C. contract is for the space of one year, and this winter the City of Cleveland and City of Detroit will have the regulation U. S. M. sign painted on the bows, giving them the right of way and making striking stevedores who refuse to unload the boats liable to the United States for delaying the mail.

Vicker's Sons and Maxim, the shipbuilding and naval armament company at Barrow, England, have gun contracts on hand to keep that branch of the business going for five years.

CLEVELAND.

Special Correspondence to The Marine Record.

The Cleveland & Buffalo Transit Co., announces that on account of the number of applications received it intends to run another excursion to Buffalo and the Falls next Saturday night.

Placing vessels in winter quarters is now the order of the day, and this week will see quite a fleet tied up until next spring. The Bessemer and Wilson boats are quitting for the season.

Three more boats will be added to the winter fleet in Cleveland in the next few days. They are owned by the Republic Iron & Steel Co., and have been managed this year by M. A. Hanna & Co. The Corsica, the German and the Grecian now on the way here to tie up are the three steamers to close their season.

The Champion Rivet Co., of Cleveland, has closed a contract for all the boiler rivets required for the boilers for the 23 new vessels now being built by the American Ship Building Co. These rivets are to be used in large Scotch marine boilers carrying from 200 to 250 pounds pressure. The largest diameter rivet is $1\frac{3}{8}$ inches and the amount involved is 200 tons.

The total movement of iron ore for 1900 to date is 17,287,952 tons, as against 15,594,298 tons a year ago. The report shows that the total receipts to date have been about 2,000,000 tons in excess of the shipment last year. It is confidently expected that the increases will stop here. If the movement of ore down the lakes this year is to be 18,000,000 tons the boats have yet to bring down the lakes upwards of 700,000 tons, which will be easy work for the remainder of November and the first half of December, through which the boats will be operated.

Capt. John Leonard, one of the most popular masters on the lakes, died at the residence of Mr. Philip Baum, No. 2 Franklin court, of paralysis on Tuesday evening. Capt. Leonard was sixty-eight years of age. His wife and three grown-up children survive him. The remains were taken to Ogdensburg, N. Y., for burial. Capt. Leonard was master of the steamer Tampa when she was driven ashore on Lake Superior a year ago last fall. He sailed the steamer Lloyd Porter this season, but had to leave the boat about two months ago. Capt. Leonard was a member of the local lodge of the Shipmasters' Association, and was generally well liked by all with whom he was brought into contact both ashore and afloat.

Coal tonnage is in fair demand, but otherwise the freight market is very dull and vesselmen do not look for much improvement, and some owners are placing their boats in winter quarters as fast as they can get down. Coal shippers to way ports are being forced to bid rates up to get boats, but shippers to the leading ports are in fair shape and are not pressed for tonnage. Forty cents was paid to Racine yesterday, which is an advance of 10 cents. The lumber freight market is in about the same condition it was at the close of last week, vesselmen are holding for \$3 from ports at the head of Lake Superior. Shippers are making a fight against paying it and no charters are being reported. The movement of wild ore will not cut any figure during the balance of the season.

The ore question has been about settled for this year. It was believed that certain sales of ore would be made that would prolong the ore shipping season, but these have fallen through owing to a disagreement as to the price, and from now on the movement of ore will be extremely light. No ore will be brought down from Lake Superior, but some of the contracts from Escanaba do not expire until November 15, and some of them will keep the boats going as long as the lakes are open. There will be a certain amount of ore moving as long as it can be obtained, for with conditions as they are \$1.25 charters are not to be thrown over lightly. The ore movement is confined entirely to contract tonnage hence no market is possible, that having been fixed months ago. The only interest apparent is in keeping the boats moving rapidly and without delay. The grain trade is none too vigorous, and holds out no hopes for profitable employment to the tonnage that might wish to engage in it after the end of the contract ore season. Of a necessity many boats will lay up. Boats are doing a good deal of running around, but aside from the contract tonnage are not making money. They are going further after a load than they have gone in a good many months, and the light trips are more numerous than those with cargoes. No ore has been sold for next year, and without such sales it is not feasible to fix the carrying rates.

While attempting to enter Ashtabula in a heavy sea on Monday afternoon the towline of the steamer Rosa Son-smith parted and before another line could be secured she drifted on to the beach, about 300 feet east of the east pier, where she is resting on bowlders. The crew of seven were taken off safely by the tug Kunkle Brothers. The Son-smith owned by L. P. Mason of Saginaw and has a registered tonnage of 766 tons gross. She was in command of Capt. John Goldsmith and was towing behind the steamer T. S. Christie. She carried about 1,600 tons of ore. The Son-smith was loaded at Escanaba by M. A. Hanna & Co. The ore cargo is insured, but the owners have no insurance on the vessel. The Son-smith was built at East Saginaw in 1882. The steamer Christie, which had the stranded vessel in tow, got into Ashtabula all right.

BUFFALO.*Special Correspondence to the Marine Record.*

There is no change from the rate of 30 cents to principal ports and 35 cents to Portage Lake. The shipments of coal by lake have begun to brisk up, though all in anticipation of the coming supply, for there will not be anything in for some time yet. The amount shipped last week was 24,710 tons, considerably more than for any week since the strike began. The distribution was as follows: Milwaukee, 9,800 tons; Duluth-Superior, 8,000 tons; Chicago, 4,000 tons; Hancock, 1,250 tons; Lake Linden, 1,050 tons; Port Colborne (soft), 610 tons.

The Black Diamond of Chicago and New York sums up the local coal situation as follows: Buffalo advices are that there is some stir in hard coal circles on account of the ending of the strike in the anthracite fields, and as evidence of this the shipments by lake are more than treble what they were the week preceding, amounting to 24,710 tons, distributed as follows: Milwaukee, 9,800 tons; Duluth-Superior, 8,000 tons; Chicago, 4,000 tons; Hancock, 1,250 tons; Lake Linden, 1,050 tons, and 610 tons soft coal to Port Colborne. Freight rate, 30 cents. It is remarkable how well the shippers have taken care of the local and lake trade, considering there was little surplus coal.

After a careful review of the testimony they have taken, the local steamboat inspectors have revoked the license of Capt. Thomas Brennan, of the tug Comet, which recently stranded on Hoover's Point, in Lake Erie, and subsequently became a total loss. The inspectors also report that the certificate of inspection for the Comet gave her the right to run on Niagara river and Buffalo harbor and that at the time of the accident she was being navigated on waters other than those named in the certificate. In addition the tug was not equipped with a life raft, as is necessary for a craft sailing on the wide waters of the lake. At the time of the accident the Comet was bound for Depot Harbor.

DULUTH-SUPERIOR.*Special Correspondence to The Marine Record.*

Shippers from the head of Lake Superior are making a hard fight against paying \$3 on lumber from the head of Lake Superior, and no charters are being reported. There is a fair demand for tonnage and some business has been done at \$2.75.

The Dunn mine, Crystal Falls, Mich., which was operated by the Corrigan & McKinney interests, has suspended operations. The old shaft caved in some time ago, and the work of sinking a new one has been in progress since the early part of the season. The mine will be closed for an indefinite period.

The mines of Minnesota are shipping slowly, and vessel men are complaining of the delay. This has been especially noticed in vessels chartered for \$1.25 a ton for the season, some of which lost a full trip in October. The present rate is little more than half the contract price. Shipments for the season close this week with many mines.

James Smith, who has been connected with the Superior ship yards for several years, has gone to Toronto, where he has obtained a position with John Inglesand & Son. Mr. Smith will have charge of the construction of the engines of the steamer now under course of construction for Captain McDougall at Collingwood, which will be patterned after the North West and North Land, and which will ply between Duluth and Sarnia.

The new mines of the Michipicoten district suspend shipment for the season this week, with a total of 50,000 tons to their credit. The mines have been developed entirely within the past 15 months. The Algoma Commercial Co., which operates the mines will bring over from England four 3,000-ton steamships and a like tonnage in barges. These with the four foreign-built vessels already in use will give a capacity in 1901 for handling about 1,000,000 tons.

The Duluth & Iron Range railroad has received about 60 or 75 of the new steel ore cars and they have lately been put in service. The new cars are giving entire satisfaction. The Duluth & Iron Range road ordered 350 tons of the steel cars for delivery in June. About 200 cars of the order have been shipped to the road and others are now on the way. The new cars have a capacity of 130,000 pounds. The standard size of Iron Range ore cars in the past has been 57,000 pounds.

There is much speculation here as to the price of lake ores next year, says the Duluth Dispatch, and mining men in general look for a lower scale by at least \$1 to \$1.50 per ton. Mesaba producers who have this year sold at from \$4.25 to \$4.85 are figuring out that if they get \$3.35 to \$3.50, they will be satisfied. All this reduction will not come from the mines. The lake freight will absorb about 70 cents of it. Miners have been let out at a number of properties on the old ranges. Efforts are being made at many lines to get rid of stock of ore on hand and there will be less on the surface at the close of navigation than has been expected.

Early in the spring it was figured that Minnesota would have at least four iron mines which would each ship 1,000,000 tons or more, says the Duluth Tribune. The Fayal was scheduled for 1,500,000 tons, and the Mahoning, Mountain Iron and Biwabik were expected to forward at least 1,000,000 tons each. But none of these expectations will be realized. The Fayal will probably take the record by shipping somewhat more than the Mountain Iron last year. The Mountain Iron's record for 1899 was 1,137,000 tons. The Fayal

was prepared to ship 1,500,000 this season, but the demand for the ore did not warrant the movement. The Mahoning mine will probably come within 100,000 tons of the amount aimed at. The Mahoning Ore Company sells to the various interests which control it, and if the ore is required, it will be forwarded to the amount of 1,000,000 tons. The Mountain Iron mine produces an ore of such fine formation that it cannot be used to as good advantage in the furnaces as the coarser classes of soft ores. The Oliver Iron Mining Co. will not begin to ship as much from that property this year as last for that reason. The Mountain Iron, Oliver and Ohio combined may ship 1,200,000 tons.

NOTICE TO MARINERS.

TREASURY DEPARTMENT,
OFFICE OF THE LIGHT-HOUSE BOARD,
WASHINGTON, D. C., October 29, 1900.

HIGH POINT BEACON LIGHT STATION.—Notice is hereby given that on October 17, 1900, the fixed white lens-lantern light was re-established, on a temporary structure, at this station, at High Point, easterly side of Portage river. The light is shown at the same height as heretofore, viz, 12 feet.

ST. MARYS FALLS CANAL (S. PIER) LIGHT STATION.—Notice is hereby given that on November 1, 1900, the fixed white lens-lantern light was permanently discontinued at this station, on the westerly end of the south pier at the westerly entrance to St. Marys Falls Canal.

Two red lights, one vertically above the other, 35 feet and 15 feet respectively, above lake level, the upper light electric, the lower oil, are maintained on a pole, on the westerly end of the south pier, by the officials of the canal. In case of the failure of the electric light an oil light of the same color will be shown in its place.

ONTONAGON PIERHEAD LIGHT-STATION.—Notice is hereby given that on or about November 6, 1900, a fixed red light of the fourth order will be established in the tower recently erected on the west pier, near its outer end, at the entrance to Ontonagon Harbor, southerly shore of Lake Superior.

The focal plane of the light will be 31 feet above lake level and 26 feet above the base of the structure.

The structure is a square, white, pyramidal, skeleton, iron tower, the upper part inclosed.

On the same date the temporary fixed red lantern light near the outer end of the pier will be discontinued.

SANDUSKY BAY INNER RANGE LIGHT STATION.—Notice is hereby given that on or about December 1, 1900, the following changes will be made in the lights at this station, on the northerly side of the entrance to Sandusky Bay from Lake Erie, and on the northerly prolongation of the axis of the straight channel in the bay.

Front Light.—The color of this light will be changed from white to red, and the arc of illumination will be reduced from 270° to 180° of the horizon, to the westward of N. 33° W. (NNW. $\frac{1}{8}$ E.) and S. 33° E. (SSE. $\frac{1}{8}$ E.)

Vessels entering the bay from the lake on the Sandusky Bay outer range line should begin the turn into the straight channel as soon as this light becomes visible.

Rear Light.—The color of this light will be changed from white to red, and the arc of illumination will be reduced from 270° to 90° of the horizon, the light to be visible from the direction of Sandusky through an arc of 45° on either side of the range line, or between N. 27° 56' W. (NNW. $\frac{7}{8}$ W.) and N. 62° 04' E. (NE. by E. $\frac{1}{2}$ E.)

Notice is also given that on the opening of navigation in 1901, or as soon thereafter as practicable, the color of the keeper's dwelling and the two towers will be changed from yellowish drab to bright yellow, and the foundation cribs will be painted red.

By order of the Light-House Board.

FRANCIS J. HIGGINSON,
Rear Admiral, U. S. Navy, Chairman.

LIGHT-HOUSE ESTABLISHMENT,
OFFICE OF THE LIGHT-HOUSE INSPECTOR, 10TH DISTRICT,
BUFFALO, N. Y., November 1st, 1900.

The light-house tender Haze will leave Buffalo, N. Y., about November 15, 1900, for the purpose of taking up the buoys in Lake Erie and the Detroit river. All important buoys will be replaced with winter buoys.

The buoys at Dunkirk, N. Y., will be taken up about November 15th.

The buoys at Erie, Pa., will be taken up about November 16th.

Those at Sandusky, O., and the islands, about November 20th.

Those in Maumee Bay about November 25th.

Those in the Detroit river (excepting the gas-buoys) about November 30th.

The gas-buoys and light-vessels in the Detroit river will be left in position as late as circumstances will permit, probably until about December 10th.

The position of the Bar Point light-vessel, after its removal will be marked by a black spar-buoy.

Waverly Shoal buoy and the Niagara river buoys will be kept in position as late as the season will allow.

The St. Lawrence river and Lake Ontario buoys will also be left in place as late as possible.

By authority of the Light-House Board,

A. DUNLAP, Commander, U. S. N.
Inspector 10th L. H. District.

FLOTSAM, JETSAM AND LAGAN.

The wet corn in the cargo of the steamer John Duncan turned out to be 4,925 bushels, considerably more than the first estimate. The Pueblo had 470 bushels of wet corn. So far this fall these are the only damaged cargoes worth mentioning.

The Eastern Ship Building Co., is mentioned as among the firms that will receive specifications for the new government cruisers, bids for which will be opened on December 7. The Bath Iron Works and the Fore River Engine Co., are among the other New England concerns mentioned.

The schooners E. R. Blake, Horace Tabor, George A. Marsh, and Jessie L. Boyce have been engaged to carry potatoes from Door county to Chicago, Messrs. O. J. Vanderhoof and J. R. Ryan are now engaged in picking up 50,000 bushels of the tubers at different points in the county, and they will be loaded onto the vessel as fast as possible.

The American schooner Fred. L. Wells went ashore, four miles east of Oswego, N. Y., on Monday night, in the north. The crew was taken off the wreck by life-savers from Oswego. The rescue was attended with great difficulty and much danger from the heavy seas. The lost boat was bound from Sacketts Harbor to Oswego, and was running light. She will probable be a total loss.

Joseph Gilchrist, of Cleveland, who is building eight steel freighters of 5,000 tons capacity each, says there is much more advantage in building that sized craft than 500 footers or anything over 7,000 gross tons capacity. The 5,000 ton boat is considered a better all-around business craft. They must carry coal, grain or ore, as the freights may offer. If engaged in the regular ore trade the big boat would be the best.

Names for the six new Holland submarine boats for the navy have been decided upon. The places of construction and contract time for the new boats are as follows: Adder, nine months, Crescent Shipyard, Elizabethport, N. J.; Grampus, eight months, Union Iron Works, San Francisco, Cal.; Pike, nine months, Union Iron Works; Moccasin, Crescent Shipyard; Porpoise, ten months, Crescent Shipyard; Shark, eleven months, Crescent.

It comes out now that the report that a sale of the Union dry dock was on, was well founded, but it is now held that the announcement made recently is premature. It is said that there is no sale yet, but that Superintendent Gaskin and two New Yorkers, known merely as Warfield and Sample, and supposed to be promoters, have an option on the dock, but will have to raise some funds before they can complete the purchase. Likely they can do this, for the Erie Railroad Co., which owns the dock property is supposed to be anxious to sell.

It seems that new records are established every season in carrying iron ore on Lake Superior. The latest big cargo reported was taken down by the steamer Maricopa and two barges for the Minnesota Iron Company. The barges were towed by the steamer, and the three vessels together carried 22,635 tons of iron ore, which is claimed to be the greatest quantity ever moved on Lake Superior by a single engine. The average speed made by the tow was 11 miles an hour, and the crews numbered 41 men, of whom 25 were on the steamer and 8 on each barge. At the season contract rates this great cargo would bring the vessels \$27,956 for the trip. It would certainly be difficult to exceed this in the way of transportation.—Engineering and Mining Journal.

The New York Ship Building Co. have practically completed their new plant at Camden, N. J., in the harbor of Philadelphia, where they have adequate facilities for the construction of war vessels, ocean liners, cargo ships, yachts and coasting steamers, as well as engines, boilers, hulls and joinery work. The plant covers an area of 130 acres, having a frontage of 3,600 feet on the Delaware river. The floor space of the building is 22 acres. The building slips can accommodate hulls of 700 feet in length at present, and are capable of extension so that any length desired can be constructed. The entire plant is fire proof and all machinery is new. The company has already under contract one ship of 4,200 tons burden, one of 11,000 tons, and one of 5,500 tons. These are cargo ships of slow speed.

R. L. Mead, secretary of the Risdon Iron Works, of San Francisco, was in New York, last week, en route to Washington, and as a result of his visit to the east it is reported that the San Francisco company contemplates the establishment of a shipyard near New York. It is said that the Risdon officials have negotiations under way for a tract of land comprising about 100 acres, and which is located on the New Jersey coast within an hour's ride of New York city. As the San Francisco company has been acquiring additional land of late, and now has 1,700 feet water frontage on San Francisco bay, with a very large dry dock under construction, the report of another works near New York is probably doubtful, but Mr. Mead would neither confirm nor deny it. His visit to Washington is in connection with the contracts soon to be let by the Government for 11 vessels of war—five battleships and six armored cruisers. Under the law not more than three of these ships may be built on the Pacific coast. These may be two battleships and one cruiser, or two cruisers and one battleship. Mr. Mead says that the Risdon Iron Works intends to submit bids for the construction of the three Pacific coast vessels in competition with the Union Works, of San Francisco, which has built all the vessels of war thus far turned out on the Pacific.

DREDGE FOR CALCUTTA.

At the successful conclusion of the trials of the great dredge plant built for the Russian Government by the Societe John Cockerill, of Seraing, near Liege, Belgium, from the designs of Lindon W. Bates, of Chicago, (reported by me February 9, 1899, and published in Consular Reports No. 224, May, 1899, page 79), Mr. Bates was invited to accompany one of the Russian imperial ministers through the canal system Marie, between the Baltic Sea and the head waters of the Volga river, and to inspect and report on the proposed widening and deepening of the system. As the outcome of this report, Mr. Bates and the Societe John Cockerill, in collaboration, are in negotiation with the Russian Government to supply the plant for the destined improvement, according to the recommendations of Mr. Bates.

These dredges are designed with special reference to the varying local conditions which obtain in the different sections of this important canal system. There are three types to be employed: the Bates hydraulic suction dredger, the American single-bucket machine, and the American endless-chain-bucket machine, which was so successful at Panama.

The first of four dredges has just been completed at the Walker Shipyards, London, England. The remaining three are intended for work in Queensland, and are much more powerful than the vessel forming the subject of this description, which is intended for work at the Kidderpore docks, Calcutta, India. These are large and expensive docks, which were finished a few years ago and have already been found to be too small for the demands of commerce.

The orders for these dredges were to a large extent the outcome of the remarkable results obtained with Mr. Bates' dredger Beta on the Mississippi river, and since then with the big dredger built for the Russian Government by the Societe John Cockerill, of Seraing, Belgium, and intended for the improvement on the Volga. While the leading features of the Bates system, with numerous improvements, have been retained, a considerable change in the appearance and arrangement of the craft has taken place, which is primarily due to its having to perform the voyage to its destination under its own steam.

The dredging mechanism is of the kind generally adopted in the Bates system, and consists of a hollow, rotary milling cutter at the end of a suction ladder, capable of work at varying depths, the extreme in the present case being 32 feet below water level. The spoil is discharged by the pump through a system of floating pipes incased in elliptical pontoons and connected flexibly by means of the Bates ball-and-socket joint, packed with pneumatic tubing, which has been found greatly superior to the flexible rubber or leather joint pieces usually employed. The end of the discharge pipe line is formed by a pontoon or special shape and adapted for connection to shore pipe, or else for discharging into the water. In this case, the motion necessary for distributing the dredged material is imparted to the pontoon line by a hydraulic distributor which also forms one of the special features of the system. The dredger is adapted for working either straight ahead or for radial dredging. In the latter case it is anchored by one of two spuds or vertical anchors, alternately, and swung through the arc requisite to obtain a channel of the desired width. The main dimensions of the hull are: Length over all, 128 feet; length between perpendiculars, 124 feet; breadth, extreme, 30 feet; depth, molded, 8 feet 9 inches.

A raised forecastle deck and bridge decks are provided, and aft of the bridge deck a quarter deck. The boiler room occupies the center of the vessel, with coal bunkers of a total capacity of 70 tons on each side. Under all the machinery and boiler spaces a double bottom is built. Ample accommodations for European officers and crew, and for a native crew, are also provided. The suction ladder is placed in a well way at the bow.

The machinery comprises the main pumping engine, driving the sand pump, the propeller, the cutter engine, a hoisting engine for raising and lowering the suction ladder, and a similar engine for lifting the spuds, steering engine and the usual auxiliary machinery, with the addition of a force pump, which supplies filtered water to all bearings placed under or in contact with sandy water, so as to exclude grit from the working surfaces.

The cutter is of the usual Bates form, and consists of twelve knives made of steel plate and forming a hollow cylindrical milling cutter.

The dredging pump has a steel rudder and a cast-iron casing, made in five pieces, which experience has shown to require renewal at different times.

The main engine, which is coupled directly to the centrifugal pump, is of the usual vertical marine compound type. Steam is supplied to all the engines from a Babcock & Wilcox marine boiler, with four furnaces adapted for using Indian coal.

A feature of this dredger is the spud or vertical anchor, two of which are provided at the stern. They are square spars of Oregon fir, guided in well ways built into the ship, and are fitted with cast-steel shoes.

Very complete arrangements are made for controlling the whole of the dredging and navigating mechanism from the operating house.

A telephone is also installed on the end pontoon, communicating with the pilot house, so that the officer in charge is in constant communication with all his subordinates.

The end pontoon, by which the position of the whole line of discharge pipe is controlled, also contains some features of interest. It may be used either for distributing the spoil into belts, or for connecting to a line of shore pipe discharging over a bank. Suitable arrangements for changing from one method to the other are provided.

The capacity of the dredge is from 300 to 1,000 cubic yards per hour, according to the character of the material handled and the distance to which it is discharged.

Satisfactory dock and sea trials were made with the dredger before it left the Tyne. A speed of 8 knots was developed on trial.

ALFRED A. WINSLOW, Consul.

Liege, August 15, 1900.

TRAFFIC THROUGH THE ST. MARY'S FALLS CANAL.

STATISTICAL REPORT OF LAKE COMMERCE THROUGH CANALS AT SAULT STE. MARIE, MICHIGAN AND ONTARIO, FOR THE MONTH OF OCTOBER, 1900.

EAST BOUND			
Articles.	U. S. Canal.	Canadian Canal	Total.
Copper.....net tons	13,465	1,440	14,905
Grain.....bushels	2,617,723	309,640	2,927,363
Building stone.....net tons	7,908	1,990	9,898
Flour.....barrels	1,029,292	104,388	1,133,680
Iron ore.....net tons	1,927,517	225,051	2,152,568
Iron, pig.....net tons	2,047	90	2,137
Lumber.....M. ft. B. M.	140,180	1,081	141,261
Silver ore.....net tons	.....	.....	.....
Wheat.....bushels	1,700,759	345,517	2,046,276
General mdse.....net tons	11,100	1,388	12,488
Passengers.....number	851	886	1,737
WEST BOUND.			
Coal, hard.....net tons	13,047	.....	13,047
Coal, soft.....net tons	343,860	63,360	407,220
Flour.....barrels	.....	5,375	5,375
Grain.....bushels	10,800	60,000	70,800
Manufactured iron.....net tons	5,792	.....	5,792
Salt.....barrels	72,602	4,280	76,882
General mdse.....net tons	58,234	15,630	73,864
Passengers.....number	647	1,082	1,729
Freight—			
East bound.....net tons	2,414,365	261,529	2,675,894
West bound.....net tons	431,996	81,403	513,399
Total freight.....net tons	2,846,361	342,932	3,189,293
Vessel passages—			
Number.....	2,058	458	2,516
Reg'd tonnage.....net tons	2,533,143	380,012	2,913,155

Compiled at St. Mary's Falls canal, Michigan, under direction of Lieut.-Col. G. J. Lydecker, Corps of Engineers, U. S. A. Joseph Ripley, Asst. Engr. and Genl. Supt.

WRECK AND CASUALTY REPORT FROM SEPTEMBER 16 TO OCTOBER 15, 1900, INCLUSIVE.

1. September 20.—Canadian steamer St. Andrews stranded on Blanchard's Island, Black Bay, Lake Superior, and shortly after slid off the rocks into deep water and became a total loss; the crew reached shore in safety but lost all clothing; estimated value of vessel, \$50,000; no cargo.

2. September 27.—Dredge No. 4 in tow of the tugs Dragon and Pete Gorman, foundered off Lorain during a heavy squall; crew rescued; has been raised; estimated value of dredge, \$8,000.

3. October 1.—The steamer Douglass stranded 5 miles below Rogers during dense fog; released without damage.

Note.—September 22.—The steamer Yuma and schooner Martin collided at the mouth of Lake Huron, near the wreck of the schooner Fontana, and the Martin sunk, carrying down 4 of her crew; estimated value of vessel, \$18,000; cargo \$6,000; total loss, \$24,000.

LITERARY NOTES.

"A Century of International Commerce" is the title of an article contributed to the November number of the North American Review by Mr. O. P. Austin, chief of the United States Bureau of Statistics. Mr. Austin points out that, while the population of the world has increased during the past hundred years one hundred and fifty per cent., international trade has grown more than a thousand per cent. This wonderful development of commerce Mr. Austin traces to five great causes—steam, electricity, invention, finance and peace. The United States have well performed their part in this vast movement—their commerce having risen from \$162,000,000 to \$2,000,000,000.

The November Scribner contains Henry Norman's second installment of "Russia of To-day," which describes the great Trans-Siberian railway. The author traveled the entire length of the railroad as far as it is completed. He points out the industrial possibilities of Russia's eastern possessions. The Trans-Siberian railway holds the world's record for rapidity of construction. In seven years 2,503 miles of railway have been opened up for traffic. Thirty miles of bridges, and some very long ones will be included in the entire road. The magazine contains also an interesting article on "The Landscape Features of the Paris Exposition," by Samuel Parsons, Jr., late superintendent of parks, New York City.

"A Deep Waterway from the Great Lakes to the Gulf of Mexico" is the title of a volume just issued, consisting of papers read before the Western Society of Engineers and reprinted from the journal of that society. It is being distributed with the compliments of the legislative committee of the Illinois River Valley Association. The papers are as follows: "Lower Mississippi River from the Gulf of Mexico to Cairo," James A. Seddon; "Cairo to the Sanitary and Ship Canal at Lockport," and "The Sanitary and Ship Canal of Chicago," Isham Randolph. There is also included a report of the discussions which followed the papers by Messrs. Lyman E. Cooley, Robert E. McMath, C. H. Hutton, Isham Randolph, Thomas T. Johnston and James A. Seddon. Maps are given, too, and the book as a whole presents this important subject from the highest plane of eminence in the engineering profession.

The H. H. Johns Manufacturing Co., 100 Williams street, New York, send forth this week a booklet entitled "Something About Coverings." The brochure relates to covering steam pipes, and states that Asbestos is a fibrous mineral and one of Nature's unique products. It is found in various parts of the world and usually occurs in narrow veins or seams. When treated mechanically it yields soft, white, delicate, and exceedingly strong fibres, which can be spun, woven, and otherwise manufactured into many useful articles. In addition to its fire-proof qualities it is acid-proof and is practically indestructible. It also forms a valuable insulator for electrical purposes. For purity of material, elasticity and adaptability of structure, combined with general completeness in design, looking to efficiency with durability, our asbestos materials are easily superior to all others. There are no approved forms of non-conducting coverings now in use which do not either contain asbestos or depend upon it for their efficiency.

The Engineers' Gazette Annual for 1901 has just been issued. This is the thirteenth year of publication. It has been thoroughly revised and brought up-to-date under the editorship of Mr. George N. Arnison, editor of the Engineers' Gazette, who is a member of the North East Coast Institution of Engineers and Shipbuilders and Silver Medalist of the 1877 Session of the Institution of Engineers and Shipbuilders in Scotland. While the principal features that have characterized this work during its past successful career have been retained in the present edition, in some respects it has been altered. In conjunction with the Calendar, a Diary has been added as well as a Marine Engineers' Log and Tables for recording trial trips. The Electrical Notes have been carefully revised and additional terms included. The Notes on Engines and Boilers are entirely new and contain in a concise form practically the entire requirements regarding engines and boilers (built of steel) of the leading classification societies, namely, The British Corporation for the Survey and Registry of Shipping, Bureau Veritas, and Lloyd's Register of British and Foreign Shipping, as well as those of the Board of Trade, and as these notes are alphabetically arranged they should be found very useful to consulting and superintending engineers.

In these days of fast trans Atlantic steamers the subject of miles and knots are often discussed, and quite as often confounded; therefore the following explanation is given: A nautical mile, or a sea mile, is the length of one minute of longitude of the earth at the equator, at the level of the sea, or the 1-21,600 part of the earth's equatorial circumference. By the United States standard, and as used by the coast survey, its length is 1,152.664 common statute or land miles; 1,855.11 metres; 2,028.69 yards; or 6,086.07 feet; consequently, 1 degree of longitude at the equator equals 69.160 land miles, and a land mile equals 0.86755 part of a nautical mile. By the British standard the sea mile is about four inches longer than by the United States. Sometimes one minute of mean latitude is taken as a nautical mile. A minute of latitude at the equator is about 6 046 feet, and at the poles about 6,107 feet, the mean of which is 6,076½ feet, or, according to the British naval mile, 6 080 feet.—Ex.

ACCORDING to census figures made public on October 30, by Director of the Census Merriam, the population of the United States is 76,295,220.

THE ST. LAWRENCE ROUTE TO THE COAST.

The following article is taken from a recent issue of the Toronto Globe:

A year ago the business men of New York commenced to realize that the export grain and provision trade at that port was permanently declining at a rapid rate, and that other American ports on the Atlantic seaboard and Gulf of Mexico were cutting in. At first the cause of the divergence of the trade was generally stated to be due to the decadence of the Erie canal. Last spring an investigation was made, and it was discovered that the most prominent shippers in Chicago of grain and provisions were securing better rates to Boston and Montreal than to the other seaports. This discovery put a wet blanket upon the agitation in New York for the enlargement of the Erie canal, inasmuch as the fact was established that trade is being so distributed that New York can no longer expect to be the controlling port.

A short time ago business men commenced to realize that the Buffalo route has ceased to control the grain transportation trade. The trade is being diverted to Erie and Fairport on Lake Erie, to Georgian Bay and Montreal. There is certainty rather than fear that the decline of the grain trade at Buffalo is permanent, for the strongest competition is by American routes. The result is that interest in Buffalo in the enlargement of the Erie canal has gone by the board. One feature of the situation that is giving serious discussion is that there is so little grain that few canal boats can get cargoes, although willing to take them at the low price going. There is plenty of westbound package freight offered canal boats at New York at high rates, but not high enough to be profitable if the boats have to go east without cargo.

Up to this year there was no questioning the idea that the most advantageous route for western grain and produce to the seaboard was that by way of Buffalo, which permits the longest distance of carriage by deep-draught vessels, with transfer to canal or minimum of grade railroad. But the one disadvantage of this route lies at New York harbor, where the unprogressive facilities for transfer to ocean vessels have developed into a burdensome expense. Other seaports, such as Boston and Newport News, have not this disadvantage, and thus it has become possible to shorten somewhat, the distance of the lake carriage in deep-draft vessels and transfer the grain at Erie and Fairport. Competition in transportation, which was never greater, supplied a reason for the grain trade being so promptly diverted from the Buffalo route.

Next in popularity at present is the Georgian Bay route, permitting short distance carriage of grain in deep draft vessels, with long haul by rail. Bidders for business by this route have as their greatest advantage their combination of enterprise and determination. That method is proving increasingly successful. When it is so extended that the route will be equipped with a chain of mammoth elevators from the grain fields to the threshold of the British market, business will be established upon too strong a foundation to be displaced for many years. Reports from Chicago this season are that cargoes of grain are being secured for the Georgian Bay route much more readily than for the other routes.

Although the St. Lawrence route permitting the maximum distance of carriage by deep-draft vessels in competition with a deep artificial waterway to the seaboard, opened up for business at the beginning of this season, there is no radical increase as yet in shipments by that route. It is evident that the completion of the projected terminal facilities is essential to the securing of the great volume of business that is promised for that route. These facilities will doubtless be available at the opening of next season.

Considering the previous history of these three established routes, it is more surprising that the Buffalo route should be so heavy a loser of trade this season than that the Georgian Bay route should be so heavy a gainer. As the St. Lawrence route, with the completion of terminal equipment, will have the greatest advantage next season, it stands to reason that the Buffalo route will be harder hit than will the Georgian Bay route. The result must be to throw the bulk of the through trade to Canadian routes in the near future. Of the two projected routes for competition with the three established routes, that of the air line from Collingwood to Toronto has considerable advantage, in that it can be constructed and put in operation in a year's time, and have a good start in establishing business. The other route, that of the ship canal from Chicago to the Gulf of Mexico, is one that is not likely to be in operation for at least ten years, and probably twenty years, such is the magnitude of the undertaking.

LEVEL OF LAKE SUPERIOR.

According to J. H. Darling, U. S. Assistant Engineer, Corps of Engineers, U. S. A., the mean level of Lake Superior in October, by the U. S. gauge at Marquette, was 1.79 feet above low water datum. This is 0.08 higher than for the preceding month, whereas under normal conditions the water should have fallen 0.04 ft. from September to October.

The stage for last month was 0.17 foot higher than in October 1899, a year ago, and is 0.99 higher than the average October stage for the 26 years from 1872 to 1897.

So it will be seen that this year's stage has finally come up to and exceeded the corresponding stage for last year, which was a high one; and it promises to hold up well for the remainder of this season.

United States Forecast Officer Richardson gives the rainfall for the month as 3.07 inches, which is 0.41 in excess of the normal for October.

SHIPBUILDING RETURNS.

TREASURY DEPARTMENT, OFFICE OF THE COMMISSIONER OF NAVIGATION, October 31, 1900.

The Bureau of Navigation reports 112 vessels of 38,562 gross tons were built in the United States and officially numbered during the month of October, 1900, as follows:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM		SAIL.		STEAM.			
	No.	Gross	No.	Gross	No.	Gross	No.	Gross		
Atlantic and Gulf	52	8,474	16	659	1	1,120	6	12,690	75	22,943
Pacific	8	3,713	3	555	..	..	1	1,584	12	5,852
Great Lakes..	..	..	..	..	..	..	5	8,534	5	8,534
West'n Rivers	11	182	8	489	..	..	1	562	20	1,233
Total	71	12,369	27	1,703	1	1,120	13	23,370	112	38,562

The largest steel steam vessels included in these figures are:

Name.	Gross Tons.	Where Built.	Owner.
American.....	5,591	Chester, Pa.	Amer-Hawaiian S. S. Co.
Sierra.....	5,989	Philadel'a, Pa.	Oceanic S. S. Co.
Howard L.			

Shaw.....4,901 Wyandotte, Mich. John Shaw Transit Co.

The foregoing figures do not include craft without motive power of their own. From other sources than construction one vessel of 2,674 gross tons was added to the merchant fleet as follows:

Rig.	Name.	Gross Tons.	Why Officially Numbered.
St. S.....	Norfolk	2,674	Foreign Wreck.
E. T. CHAMBERLAIN, Commissioner.			

EASTERN FREIGHT REPORT.

Messrs. Funch, Edye & Co., New York, in their weekly report of the condition of the Eastern freight market, state as follows:

The principal feature of the freight business for the past week has been the continued large amount of tonnage taken for grain, and shippers seem still prepared to make further commitments on the basis of current rates, even up to February loading. Steamers that can make sure November loading command a slight premium. In cotton chartering the only fixture of interest is one reported from Savannah to the Mediterranean, for which destination there has been some inquiry during the last few days. In other directions, however, charterers decline to treat for further tonnage and in some cases have paid considerable sums to cancel charters previously arranged. The demand for timber steamers continues very limited, the time chartered vessels previously taken by these shippers having supplied their present wants. For coal a steamer is reported having been closed for Mediterranean ports at about 17s. 6d, at which figure shippers may possibly be able to do further chartering, although the demand is not at all brisk.

Vessels for long voyages have been more freely offered since our last and the downward tendency has in consequence been more fully developed, especially so, as charterers are unwilling to pay even present rates in the hope of obtaining further concessions ere long.

THE Bethlehem Steel Co., South Bethlehem, Pa., opens up a new agency in San Francisco in charge of The Abner, Doble Co., corner Fremont and Howard streets. The Bethlehem Steel Co. is now one of the most prominent industries in the United States.

SHIPPING AND MARINE JUDICIAL DECISIONS.

(COLLABORATED SPECIALLY FOR THE MARINE RECORD.)

Collision—Suit for Damages—Findings of Master.—The findings of a master as to the cost of restoring a vessel injured in collision, based on conflicting testimony, will not be disturbed unless there is a clear error or mistake. In re Merritt & Chapman Derrick and Wrecking Co., 103 Fed. Rep. (U. S.) 988.

Limitation of Liability—Bill of Lading.—A provision in a bill of lading limiting a carrier's liability to the value of the goods at the place of shipment does not relieve it from greater liability from a loss occurring through the negligence of the shipper in using an unseaworthy vessel. Lowenstein vs. Lombard, Ayres & Co., 58 N. E. Rep. (N. Y.) 44.

Measure of Damages.—Where the owner sold a vessel injured in collision in her damaged state he is not entitled to recover damages, in a suit for the collision, because she was not restored to her former condition by the repairs made by the purchaser, when it appears that the reason was because the repairing was not properly done. In re Merritt & Chapman Derrick and Wrecking Co., 103 Fed. Rep. (U. S.) 988.

Contract of Insurance.—A person contracting with a carrier through its agent, for the transportation of goods, is not chargeable with notice of limitation of the agent's right to contract, when he is a general agent of the company in charge of its business at the place where the contract is made, and the contract is the kind usually made by such agents. Lowenstein vs. Lombard, Ayres & Co., 58 S. E. Rep. (N. Y.) 44.

Notice of Agent's Authority.—A statement in the blanks and literature issued by the agent of a steamship company that insurance on consigned goods was free when the value was declared before the sailing of the steamer does not charge a skipper having knowledge thereof with notice that the agent has no authority to insure goods without such valuation. Lowenstein vs. Lombard, Ayres & Co., 58 N. E. Rep. (N. Y.) 44.

Injury to Cargo in Loading—Liability of Ship.—A provision of a charter requiring the charterer to supply the slings for loading cargo is complied with by furnishing the proper rope from which the slings are made, and the vessel is liable for an injury to the cargo in loading caused by an improper splicing of the slings by the seamen, who are furnished by the owner. Dene S. S. Co., Limited vs. Munson, et al., 103 Fed. Rep. (U. S.) 983.

Measure of Damages.—Where plaintiff made a contract at Mobile for the transportation and insurance of certain goods from New York to Mobile, a bill of lading afterwards given to his consignee when the goods were shipped, limiting the carrier's liability to the value of the goods at the place of shipment, did not supercede the oral contract, and the measure of damages was the value of the goods at the place of delivery. Lowenstein vs. Lombard, Ayres & Co., 58 N. E. Rep. (N. Y.) 44.

Evidence of other Transactions.—Where, in an action by a shipper against a steamship company on an alleged contract of insurance on goods lost at sea, the contract was oral, and the agent of the steamship company denied having dispensed with the valuation of the goods, but the plaintiff testified that the agent said that his line was doing business on the same terms as others, evidence is admissible of contracts made by the agent with other persons, before and at the same time, in which the valuation of the goods was not required, as showing the terms on which the company was doing business. Lowenstein vs. Lombard, Ayres & Co., 58 N. E. Rep. (N. Y.) 44.

Shipping—Construction of Charter—Injury to Ship from Cargo of Asphalt.—Under a time charter of a steamer to be employed in such lawful trades between ports of the United States and the West Indies or Caribbean Sea as the charterers might direct, the owners warranting her to be "tight, staunch and strong, and every way fitted for the service," the owner cannot recover from the charterers for injury to the vessel from bringing a cargo of asphalt from Trinidad, which was loaded under directions of the master; for while such cargo is peculiar and requires special fittings and subjects the surrounding parts of the vessel to more than the usual lateral pressure when shipped in bulk, it is not only lawful merchandise, but constitutes one of the chief articles of export from the island, and was clearly within the terms of the charter, which placed the risk of the sufficiency of the vessel upon the owner. Dene S. S. Co., Limited. vs. Munson, et al., 103 Fed. Rep. (U. S.) 983.

THE respective degrees of completion of the sea-going torpedo-boat destroyers Lawrence and Macdonough on Oct. 3, as reported by Admiral Hichborn, were 98 per cent. for the former and 96 for the Macdonough. The latter was named in honor of Thomas Macdonough, who commanded the squadron in Lake Champlain in 1814, which defeated the British squadron. In 1804 he was one of the Decatur party that re-captured the Philadelphia from the Moors. One of his sons is still living, a successful and highly respected citizen of New York city. The Lawrence was named after Capt. James Lawrence, of the ill-fated Chesapeake, who was the author of the immortal order, "Don't give up the ship."



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CLEVELAND, O., NOVEMBER 8, 1900.

LAKE COMMERCE.

The great water transportation route which stretches from Buffalo to Chicago and Duluth is sharing in the prosperity and activity which characterizes every branch of business in the United States to-day. The monthly statement of lake commerce prepared by the Bureau of Statistics shows that during September, 5,957 vessels entered 37 principal ports on the Great Lakes from the opening of the navigation season up to Oct. 1, the vessel entrances aggregated 28,039. Chicago leads the list of ports, 1,028 vessels having entered her harbor during September and 5,761 during the season. The ports of Buffalo, Cleveland and Milwaukee each, however, show a record in excess of 2,000 vessels for the season and at the ports of Detroit, Duluth and Toledo the arrivals have ranged from 1,000 to 1,500.

A considerable portion of the general public seems to have gained the impression that the traffic of the Great Lakes is confined to the transportation of a few commodities, such as iron ore, coal, bread-stuffs and lumber. That this is far from being the case could not be more conclusively proven than by citing the fact that in September, 395,767 tons of unclassified freight were moved, and the total movement for the season thus far aggregates 2,386,838 tons. Every prominent port on the lakes is represented in this total.

That the strike in the anthracite coal region has had its effect upon lake shipments would seem to be proven by a comparison of the figures for August and September. During August there were transported via the inland water-way, 516,763 tons of anthracite coal, whereas in September the shipments fell off to 257,787 tons. In soft coal there is a falling off from 661,864 tons in August to 467,457 tons in September. For the season to October 1, the total movement was 1,813,979 tons of hard coal and 2,965,328 tons of soft coal.

The recent organization in the Great Lake district of a new transportation company which has placed orders for new boats designed especially to carry the products of the Calumet and Hecla copper mines seems to call attention to the volume of this traffic already taking the water route. During September there were shipped by boat 17,029 tons of copper, and for the season to October 1, the total movement is 113,695 tons. Of the latter amount, 81,889 tons, or more than two-thirds of the total, was received at Buffalo, whereas the heaviest shipping record is that of West Superior, which during the season has sent out 56,939 tons.

The movement of breadstuffs is not, of course, so interesting as it will prove when compared with the movement by rail, for which figures will be available at the end of the calendar year; nevertheless the statement of this phase of the water-borne commerce is significant in many ways. The

receipts of breadstuffs at the principal ports have been as follows:

	September 1900	Season 1900 Opening of navigation to October 1.
Articles	Bushels	Bushels
Wheat.....	8,752,364	33,331,173
Flour, tons.....	171,434	672,036
Corn.....	6,625,502	47,862,192
Oats.....	5,195,052	25,776,512
Barley.....	1,224,977	3,886,350
Rye.....	162,970	1,148,846

The Bureau of Statistics compilation discloses many unique characteristics of the commerce of the Great Lakes. For instance, in the case of Conneaut, O., which Andrew Carnegie has declared will one day be the greatest ore-unloading port in the world, the 353 vessels which have entered the harbor this season, have brought 1,748,255 tons of iron ore, or a greater quantity than was discharged at any other port, with two exceptions. One of these exceptions is the port of Ashtabula, also on Lake Erie. Ashtabula will this season rank as the greatest ore-receiving port in America, having received up to Oct. 1 a total of 2,933,647 tons.

The lake lumber trade, in which there was such demoralization last year, appears to be making a very favorable showing this season. For the month of September the aggregate cargoes transported amounted to 436,926,000 feet, and for the season up to October 1, 1,427,000,000 feet. Duluth ranks as the greatest lumber-shipping port, having sent out 277,071,000 feet during the season. Chicago heads the list of receiving ports, 378,546,000 feet having been unloaded at her wharves. Cleveland is a pretty close second with a record of 339,704,000 feet for the season.

GOVERNMENT REPAIR SHIP.

Admiral Melville, in his annual report, among other things, says: "A properly equipped repair ship would have been of the greatest service during the past year in Asiatic waters. I respectfully repeat my former recommendation that a repair ship be built especially for the purpose, with high between decks, and with such moderate protection and armament as may be deemed advisable, and to be equipped under this bureau with a complete repair plant, improving upon that installed upon the Vulcan. This repair ship should be at least 5,000 tons displacement, and the estimated cost of the entire vessel and tool equipment would be in the neighborhood of \$1,000,000." He also says there has been great delay in extending and improving the shops of the department at different stations, owing to the high prices of materials during the year.

A LARGE RUSSIAN ORDER.

A special from New York Herald says that Russia is to place orders with American shipbuilders for five new battleships during the next year. Secrecy seems to be the order with those in a position to give information, but the bare fact that in prosecuting her naval construction program Russia will favor American building comes from an authentic source, according to Joseph Spencer Kennard, one of the commissioners from this country to the Paris exposition, who has arrived here on the steamship Touraine.

Contracts for five battleships will involve more than \$20,000,000, and the fact that Russia contemplates placing these orders here is regarded as a recognition of the merits of the American-built cruiser Variag, which, designed to make a speed of twenty-three knots, showed herself capable, in her speed trials, of maintaining a speed of 24.6 knots. Now being pushed to completion by the Cramps, who built the Variag, is the battleship Retvizan, the first battleship built here for a foreign country. She was launched October 23. Beyond the information that the order was to be placed here Mr. Kennard said that he could say nothing and that he could not, with propriety, make known the name of his informant.

Waldimer Teplow, the Russian consul-general, also returned on the Touraine, after an absence of four months in Russia. He left St. Petersburg October 20. Mr. Teplow said he could not confirm the report of the prospective placing of orders for battleships in this country, but he said that there was such enthusiasm in Russia over the Variag and Retvizan that it is likely that the next warships built for Russia will be laid in American shipyards.

"All Russians," he said, "are perfectly satisfied with the Variag and the Retvizan. They are fine ships. We think American builders are among the best in the world. Some builders show a sample ship and obtain an order for one like it, but the finished product likely does not correspond with the sample. But this is not so with American builders. They make us a ship just like the model."

A LARGE NEW CARGO STEAMER.

Largest of her type, first to enter her owner's service, and representing a departure in American shipbuilding, the steamship America, from the yards of her builders at Chester, Pa., loaded at the Independence pier, Forty-second street, South Brooklyn, N. Y., last week for San Francisco and Honolulu.

One of the first two vessels built for the American-Hawaiian Steamship Company, she is the first of the fleet building for service between the two oceans. Her sister ship, the California, launched at the Union Iron Works at San Francisco in July was at once chartered by the government for the army transport service across the Pacific.

The American may be said to be a vast improvement on the British tramp steamship type. She is designed solely for cargo, and is not fast. She has a single screw and triple expansion engines. Her shafting is made of compressed steel, as are those of the American naval vessels. She made twelve knots coming up the coast, but on regular service will be run at ten knots, making the thirteen thousand mile steaming course to San Francisco in sixty days, with a stop at Coronel, Chili, for coal.

In appearance the American is unlike any vessel ever built in an American yard. She has the amidship superstructure with poop and forecastle, and with intervening wells where the sides are cut away.

The American's two masts are merely derrick poles, not much higher than the smokestack, so the absence of rake in the funnel is not marked.

Something of a sheer is preserved in construction, and this with shapely bow and stern, make even this craft very slightly as compared with most vessels of her type.

She is lighted throughout with electricity, and electric clusters can be carried into the holds for night loading. She carries forty-men all told, and is commanded by Capt. George McDonald, formerly of the Hogan line. She is 435 feet long, 58 feet beam and 33.6 feet depth, drawing twenty-six feet loaded and ten feet light. She registers 5,600 tons, and her capacity is 8,250 tons dead weight. She cost \$450,000.

Two more sister ships of the American are building at Chester, to be called the Hawaiian and the Oregonian. The former will be launched a week from Saturday and will make her first trip in January. The other steamers are under construction at the Union Iron Works. They are to be known as the Alaskan and the Arizonian. They will be twin screws, and have a capacity of 11,000 tons dead weight. They will cost, because of their twin screws and additional size, which will be 7,500 tons gross register, \$700,000.

Two more are building at the new shipyards of the New York Ship Building Company, at Camden, N. J., one to be a sister ship of the last two mentioned, and the other smaller, or of about 5,000 tons register. She is to be used locally between San Francisco and Honolulu.

FOR WINTER STORAGE.

More than the usual number of vessels will take on cargoes for winter storage this year. In fact, the immense quantity of room available for this service will be a factor in the storage capacity of nearly every grain center on the lakes. During the last year there have been a large number of ore carriers of immense storage capacity added to the list of lake vessels, and if these elect to enter the business of storing grain for the winter they will become an important factor in the situation. Just what position these big vessels will take in regard to grain storage is not known, but it is the popular belief that they will go out for what there is in sight. All of the boats that have been built for the Carnegie, the Bessemer, the American Steamship Co., or the Minnesota Steamship Co., are in themselves floating elevators and their combined capacity is not to be despised.

One advantage which the big steel boats have over the wooden vessels is that they do not suffer as greatly from being loaded deeply during the winter months. It is more than likely that Chicago will be the point which will attract the greater part of this immense vessel capacity, but Milwaukee and other Lake Michigan ports will get their share, and Duluth may also come in for a good total. Just at present the vessels loading coal at eastern markets are trying to get Lake Michigan cargoes so as to be able to secure return cargoes of grain. Very little grain is to be had at Duluth, and vessels therefore avoid that port with west-bound cargoes if it is possible to go elsewhere. At Duluth, however, there is more demand for coal than at the Lake Michigan ports, and it is not improbable that quite a number of vessels will eventually be caught there at the season's end.

AN IMMENSE INDUSTRY.

The Oliver Iron Mining Co. (Carnegie's) Saturday finished its season's shipments to Conneaut wharves, whence the ore is carried by Carnegie's railroad to Carnegie's furnaces at Pittsburg, to be converted into pig iron, which in turn is manufactured at Carnegie's mills, scattered throughout Pennsylvania, into steel billets, rails, vessel plates, frames, shapes, and angles; into the scores of variously-shaped pieces used in building construction in all parts of the United States; into armor plate for the new sea fighters being built for Uncle Sam; and into hundreds of other things, the purposes of which are multifarious, says the Detroit Free Press.

The raw product needed by him to supply the demand this year, not in this country alone, but in all part of the world, amounted to 5,500,000 gross tons of ore. Every pound of this was blasted, dug, and pulled out of hills and valleys owned by Carnegie, transported in his own railroad to his own wharves at the head of the lakes, and brought down the lakes to Conneaut by immense steel carriers owned and chartered by Carnegie. So it will be seen that the astute magnate is not compelled to submit to the domination of any man, railroad company, propeller line, dock manager, or mine operator, or clique of operators, in the matter of prices for the ore, charges for transporting it, or charges for storing and transferring it. He wished to be the whole thing, and, having the money, he is practically "it." With the laboring element he has the same dealings and pays the same prices as his competitors, for not even his money can control the labor market. However, disputes with his men are the least of his troubles, and he is little bothered by them.

This very mastery over all the department of mine and lake manufacturing commerce enumerated allows him a tremendous leeway in underbidding his competitors, not only in this country but all over the world. Where rivals are compelled to accept the prices of others, high or low, he makes his own prices, which are always low to himself. Thus he can undersell rivals in fields monopolized by them for years—can undersell them 10 to 30 or 40 per cent., and yet win a greater margin of profit than they could have commanded at the highest prices.

Not another concern in the whole world combining all or part of the elements of iron and steel manufacturing has in this year or any other used up 5,500,000 gross tons of the raw material. Not even the 3,000,000 ton mark has been reached by them.

Though his mining possessions are immense, he is adding to them while there is yet a chance to secure properties at reasonable prices. He realizes that year by year the great and rapidly growing demand for iron and steel is enhancing the value of the ground from which come the ore. He wants all of that ground he can obtain right now. What he can buy is thus forever kept out of the hands of his competitors. They are now, thought big individually, small in comparison with him, but it looks as though he wished to wipe them out of existence altogether as rivals. So he has General Manager Hulst and Superintendent Cale, of the mining company, and other experts, negotiating for the purchase of large and valuable iron exploration on the Mesaba range. And it is part of their daily occupation to be on the alert for advantageous opportunities to get possession of more.

METHOD OF RECKONING TIME IN SPAIN.

Under date of August 4, 1900, Vice-Consul Reed, of Madrid, reports:

The Queen Regent has signed a decree establishing the method of accounting time in this Kingdom, viz:

(1) In all railway, mail (including telegraph), telephone, and steamship service in the peninsula and the Balearic Islands, and in all the ministerial offices, the courts, and all public works, time shall be regulated by the time of the Greenwich Observatory, commonly known as western European time.

(2) The computation of the hours in the above-mentioned services will be made from the hour of midnight to the following midnight in hours from 1 to 24, omitting the words tarde (afternoon) and noche (night), heretofore in customary use.

(3) The hour of midnight will be designated as 24.

(4) The interval, for instance, between midnight (24) and 1 o'clock will be designated as 0.05, 0.10, 0.59.

These regulations are to take effect the 1st of January, 1901.

Government officials are directed to observe and carry out the decree in each and all of their respective departments and bureaus.

CHICAGO COMMERCE.

Chicago leads the world as a shipping port. The tonnage of the river and that of South Chicago exceeds by many tons that of either New York or London. The advantage of the lake during the period of open navigation is shown by the shipments of grain from week to week that have been shown in these columns, and the destination. For the week grain clearances were 4,945,000 bushels, including 953,000 bushels of wheat, 2,720,000 bushels of corn, and 1,270,000 bushels of oats.

A comparison with the previous week showed a gain of 823,000 bushels. The distribution of the grain was 64 per cent. to Buffalo, or 3,167,000 bushels; Erie got 371,000 bushels, and Ogdensburg 92,625 bushels, and Canadian ports 19 per cent. 922,000 bushels. There is a rush of corn to the East, and shipments were 2,720,000 bushels. The total shipments of corn were 55 per cent. of the aggregate movement.

For the months of October and November there is a record that has seldom, if ever, been broken. It represents a business that not only shows the growth of lake shipping but the readiness with which grain can be handled. The shipments were 40,980,000 bushels including 10,973,000 bushels wheat, 20,612,000 bushels of corn (for 50 per cent. of total) 9,697,000 bushels oats, 79,567 bushels rye, and 252,444 bushels barley. Of this vast quantity 67 per cent. cleared for Buffalo, causing a partial blockade there for a time.

ANOTHER SHIPBUILDING CONTRACT.

Mr. W. L. Brown of Chicago, president of the American Ship Building Co., yesterday wired General Manager J. C. Wallace that he closed a contract with C. W. Elphicke of Chicago for a 6,000-ton steamer, to be a duplicate of the steamer ordered by Mr. Elphicke about two months ago and which is now being built at the South Chicago yard. The new boat will cost about \$295,000 and will come out next July. She will be 450 feet over all, 430 feet keel, 50 feet beam and 28½ feet deep. She will have triple expansion engines, cylinders 23, 48 and 64 inches by 40-inch stroke. Steam will be furnished by three Scotch type boilers 13 feet in diameter and 13 feet long. This order makes 24 vessels, including the big car ferry steamer that the American Ship Building Co., has under contract.

LETTERS AT DETROIT MARINE POST OFFICE.

November 7, 1900.

To get any of these letters, addressees or their authorized agents will apply at the general delivery window or write to the postmaster at Detroit, calling for "advertised" matter, giving the date of this list and paying one cent.

Advertised matter is previously held one week awaiting delivery. It is held two weeks before it goes to the Dead Letter Office at Washington, D. C.

Anderson, Leo, Moonlight	Kull, Fred
Akar, Jos., Rust	Laricy, J., 4, Moonlight
Brion, Robt., J. N. Moore	La Treille, Wm., Rause
Basting, Jacob	Lawrence, Jno.
Burns Capt. Wm.	Lecuyer, Albert F.
Bentley, Frank	Miller, Gus.
Barnes, O. L.	Manders, Geo.
Brown, Jno. W.	Moore, Robt., Maytham
Broadbent, Lew, M. W. Page	Millian, Chas.
Campbell, Chas., Berlin	Mallory, Will
Carlson, N. P., Algeria	McGann, Hugh
Chenard, Dell	McMillian, Dick, Wyandot
Coffey, Thos. J., Omaha	Olson, Thos.
Everett, John O.	O'Connor, Wm., Maryland
Fettetto Swan, M. Marshall	Rexford, Roy
Fowler, Peter, Berlin	Rabidue, Capt., Monticello
Grant, Major, Business	Rush, J. F., J. B. Ketcham
Griffin, Thos., Spokane	Stoam, Frank, O. O. Carpenter
Hicks, Arthur, S. Minch	Scanlon, Jno., La Fayette
Hamilton, Jno., Berlin	Schrepperman, Jas.
Hineline, Lester	Torrell, Wm.
Jackson, John, Coralia	Whitney, James, Armour
Kristianson, Konrad, Algeria	Waring, D.
Kelley, Dan, Andaste	White, James, Thomson
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OCTOBER TRADE AT BAY CITY.

The shipments of lumber by water from Bay City during October reached the low water mark, for only 913,000 feet went out by boat and this was consigned to Cleveland. Salt shipments were 21,892 barrels, of which 17,892 went to Duluth and 4,000 barrels to Sandusky, Ohio. The shipments to date this year will not average well with the smallest month in any of the years when the lumber industry was at its prime. There has been a slight increase in lumber carrying rates during the month, and another is due today, but

that will not affect the carrying capacity, for there is no stock moving by the water route.

The receipts during the month were very light, compared with previous months during the season, only 1,685,000 feet coming in from Lake Superior ports and 3,465,247 feet from Canada. From the Dominion there also came 100,000 lath. Other receipts by water were 1,500 tons of coal, 108 cords of stone, 200 net stakes and 1,500 cedar posts.

The value on Canadian lumber and lath was \$47,343.40, and the duty amounted to \$6,953.49 for the month. The collections to date this year for imports at this port are \$266.55 in excess of the entire year of 1899.

The arrivals during the month were: Steamers, 13, tonnage 6,781; schooners, 12, tonnage, 6,868. Cleared: Steamers, 18, tonnage, 6,106; schooners, 12, tonnage, 5,412.

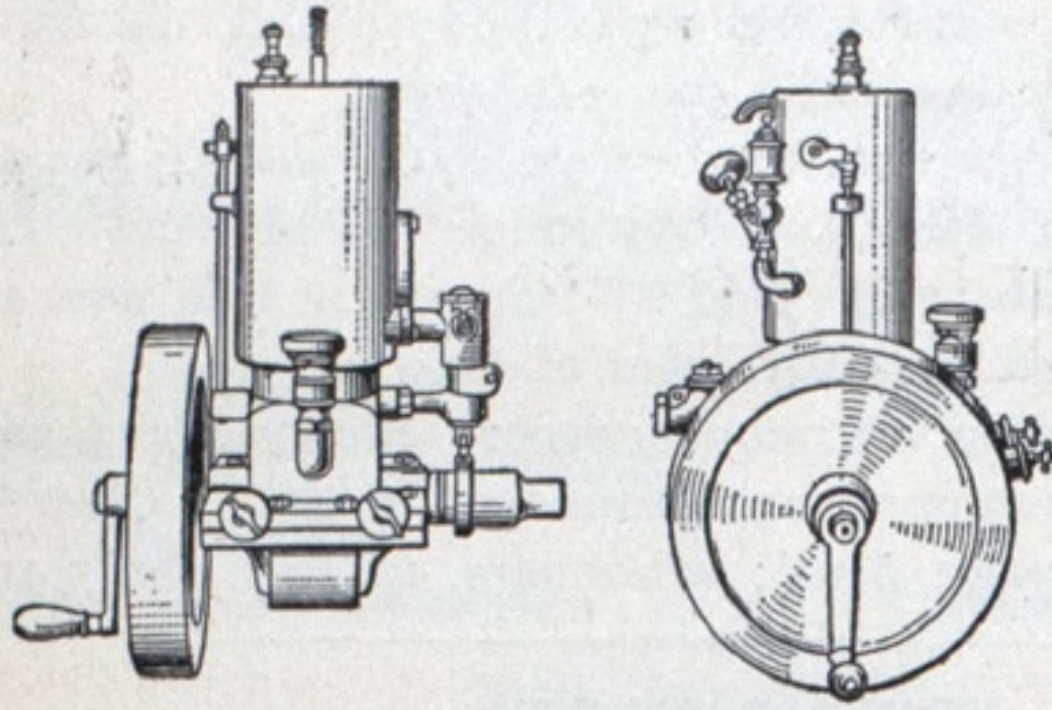
TOWING AT SEA.

We notice continually articles and notices in the American press commenting on the development of towing, both on the Great Lakes and the ocean, and as the question is fraught with great interest to the shipping community we have made some inquiries as to the methods used and the results. It appears in 1886 two American inventors, one of whom was a master mariner, and the other an engineer, brought out a machine which they claimed made it possible to tow a number of barges in exposed situations with safety. The machine was constructed and placed with the consent of the Boston Tow Boat Co., on their steam collier Orion in February, 1888. It was adopted by the company, and has remained in use ever since, and proved to be the precursor of some hundred others now in use on the Great Lakes, the Pacific and the Atlantic. One has even found its way to Europe, and has made it possible for an enterprising Swedish company to tow immense rafts of timber with great economy. An inquiry was made recently from this company, the Ohrvikens Aktiebolag, as to their experience, which now extends over two years. They reply in terse English that they could not do without the machine, as they would not dare to run the risk of towing in the old fashioned way. They also state that they have had the same hawser in use for two years, and see no reason why it should not last a number of years longer. It will be understood in a matter like this, while it affects, at the moment, a limited number of people, owing to the slight extent that towing is used in Europe, it may result in a radical reduction in freight rates for bulk cargoes. It is quite possible that in the next few years we shall see barges being towed to the coaling stations in the Mediterranean, not to speak of the coast of the United Kingdom. It is quite possible for a steamer to carry 3,000 tons, and to tow three consort, each carrying 3,000 tons, with very little increased engine power at a slightly increased coal consumption, and with perfect safety. The Shaw and Speigle towing machine has been shown to handle these immense weights with the skill and tenderness that a skilled whip will handle a team of horses. This simile gives as good an idea of the working of the machine as we can suggest. It practically gives and takes to the surges of the tows, as the driver keeps the touch of the mouths of his charges. This action is entirely automatic, and renders it possible for a wire hawser to be used on which there is little wear and tear. All practical tugboat men agree that a great deal of energy is saved if a manila hawser can be done away with. The drag of heavy manila line in the water alone represents a great loss of power. Which of our shipping men will be enterprising enough to afford us an opportunity of inspecting this new wonder at work? We are now ten years behind America and two behind Sweden, and, although it is acknowledged that American capital is now being invested in English ocean-going steamers, we would be sorry to see it make an entrance into our home trades. The machine is manufactured by the American Ship Windlass Co., of Providence, Rhode Island, whose celestial-sounding trade mark, "Providence," is so well known to shipmasters. While referring to them, they must be congratulated on securing an only gold medal for steam windlasses at the Paris Exhibition. Surely this is an award that might have been secured for England.—Liverpool Journal of Commerce.

It is now known unofficially that there is no expectation of a compromise between the two warring tug lines, no matter how much money is lost. The Maytham line banks on the idea that the exclusive contracts of the trust, made last spring at fair figures when it was not known that there would be opposition, cannot be made next season at any figure.

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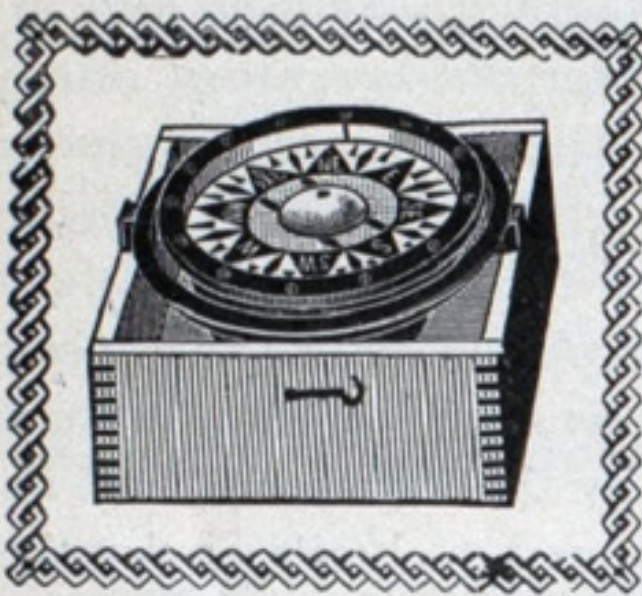
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LATITUDE AND LONGITUDE BY EQUAL ALTITUDES NEAR THE MERIDIAN AND THE GREATEST ALTITUDE OF A HEAVENLY BODY.

The subject has already been discussed in previous articles, but may still be enlarged upon to show the magnitude of all the errors of the official method in use by way of substituting easy, exact and practical solutions.

In the correct solution of the problem it has to be borne in mind that the sum of the hour angles of equal altitudes east and west in two different places, equals the elapsed time between observations, plus or minus the difference of longitude in time of the two places, plus when the place of the second observation is east from the place of the first observation, and minus when west of it.

As hour angles and the difference of altitudes with the meridian altitude are the co-ordinates of a parabola, the axis of which is the meridian, the curves for two different places may be represented on the same axis with the distance between vertexes equal to the difference of latitude of those places. The distance of any point of the curves from the axis on a line at right angles to the latter represents the hour angle for this point; and the distances on the same line of two points of different curves, the relation of their hour angles for equal altitudes.

If the hour angles in two different places are respectively a_1 and a_2 for a certain altitude, a curve may be constructed midway between the two original ones with an hour angle on the same line = $\frac{a_1 + a_2}{2}$ and a parameter corresponding to

middle latitude of the two places. This curve being shifted east on the line indicating hour angles, until its end point coincides with the first curve, the other end point will coincide with the second curve, the shifted curve thus representing the curve due to a change of position during observations. The distance of the axis of the shifted curve from the original axis equals half the difference of the original hour angles, and at the same time is the hour angle of the greatest altitude for middle latitude at the middle of the time of observations.

The equation of the reduction to the meridian reads:

$$H - h = \frac{225 t^2 \sin. 1'}{2 (\tan b + \tan c)}$$

in which $H - h$ is expressed in arc minutes and t in time minutes; H denoting the meridian altitude, h the ex-meridian altitude, t its hour angle, b the latitude and c the declination.

$$\text{Putting } \frac{225 \sin. 1'}{2 (\tan b + \tan c)} = \frac{1}{p}$$

$$p = 30,558 (\tan b + \tan c)$$

and expressing $H - h$ by y .

$$p y = t^2 \dots \dots \dots (1)$$

which is the formula of co-ordinates for the parabola, p being its parameter.

Changing the beginning of co-ordinates from the vertex to a point of the curve a minute east for which $y = q$ formula (1) transforms into

$$y = q - \frac{(a - t)^2}{p}$$

and as $p q = a^2$ we obtain by subtraction

$$y = - \frac{(2a - t)^2}{p}$$

t denoting the time from the beginning of co-ordinates.

Distinguishing quantities at the first and second observations by the indices 1 and 2, the following two equations obtain

$$y_1 = - \frac{t^2}{p_1} (2a_1 - t)^2$$

$$y_2 = - \frac{t^2}{p_2} (2a_2 - t)^2$$

and if all quantities pertaining to a curve midway between the two preceding ones are distinguished by the index 0, we

have, according to the explanation given above $a_0 = \frac{a_1 + a_2}{2}$

and p_0 to correspond to middle latitude. Hence the formula pertaining to change of position will read:

$$y_0 = - \frac{t^2}{p_0} (2a_0 - t)^2 \dots \dots \dots (2)$$

For $t = a_0$ is y a maximum, hence,

$$y_{\max} = - \frac{a_0^2}{p_0} \dots \dots \dots (3)$$

which is the correction to find from the observed altitude the greatest altitude.

To find the hour angles we have

$$\text{and } \frac{p_1 q_1}{p_2 q_2} = \frac{a_1^2}{a_2^2}$$

$$\therefore \frac{p_1 q_1 - p_2 q_2}{a_1 - a_2} = \frac{a_1^2 - a_2^2}{(a_1 + a_2)(a_1 - a_2)}$$

$$a_1 - a_2 = \frac{p_1 q_1 - p_2 q_2}{a_1 + a_2}$$

$$\text{Putting } p_1 = p_0 - x \text{ and } p_2 = p_0 + x$$

$$a_1 - a_2 = \frac{p_0 q_1 - q_1 x - p_0 q_2 - q_2 x}{a_1 + a_2}$$

$$= \frac{p_0 (q_1 - q_2) - x (q_1 + q_2)}{2 a_0}$$

$$\text{As } x = \frac{p_2 - p_1}{2} \text{ and } q_1 + q_2 = q_0 \text{ approx}$$

$$\text{which } = \frac{a_0^2}{p_0}; \text{ and as } q_1 - q_2 = \text{difference of lati-}$$

tude, which may be denoted by u , we obtain by substitution

$$a_1 - a_2 = \frac{p_0 u}{2 a_0} - \frac{p_2 - p_1 a_0}{2 p_0}$$

$$\text{and } \frac{a_1 - a_2}{2} = \frac{1}{4} \left(\frac{p_0 u}{a_0} - \frac{(p_2 - p_1) a_0}{p_0} \right) \dots \dots \dots (4)$$

$\frac{a_1 - a_2}{2}$ is the hour angle of the greatest altitude; and

from it and $\frac{a_1 + a_2}{2} = a_0$ are found a_1 and a_2 by simple addition and subtraction.

The reduction of the greatest altitude to the meridian:

$$r = \left(\frac{a_1 - a_2}{2} \right)^2 \frac{1}{p_0} \dots \dots \dots (5)$$

$$= \frac{p_0}{4} \left[\frac{u}{2 a_0} \right]^2 \text{ approximately } \dots \dots \dots (5a)$$

The preceding formulæ are very nearly exact and, therefore, preferable to those published in the MARINE RECORD of October 11 last.

The following example illustrates the reckoning:

Example: In 59° and 61° N. latitude by account true equal altitudes of the sun were found $17^\circ 45' 43''$; true course in the interval N. 30° E; distance run 138.56 miles; time between observations 1h. 49m. 49s. Declination 10° S.; find latitude and ship's time at the middle of the elapsed time. 30° course and 138.56 dist. give diff. lat. 120, depar. 69.28. Mean lat. by account 60° , and 69.28 dep. give diff. of longitude 138.56 = 9.24 m. E. elapsed time 1h. 49.82

corrected elaps. time 1h. 59.06m. = $2 a_0$

$$p_{60} = 58.31, u = 120, p_2 - p_1 = 4.28$$

Hence by formula (4)

$$\frac{a_1 - a_2}{2} = \frac{1}{4} \left[\frac{58.31 \cdot 120}{59.53} - \frac{4.28 \cdot 59.53}{58.31} \right]$$

$$= \frac{1}{4} (117.54 - 4.37)$$

$$= \frac{113.17}{4}$$

$$= 28.29 \text{ hour angle of greatest altitude.}$$

$$\text{The reduction by formula (5) } r = \frac{28.29^2}{58.31} = 13.73$$

$$\text{Correction of observed true altitude by formula (3) } y = \frac{59.35^2}{58.31} = 60.41$$

$$\text{Observed true altitude } 17^\circ 45' 72''$$

$$\text{Sum } 18^\circ 59.86'$$

$$\text{from } 90^\circ 0.00'$$

$$\text{Meridian Z. D. } 71^\circ 0.14' \text{ N.}$$

$$\text{Declination } 10^\circ \text{ S.}$$

True latitude in at the middle of observations $61^\circ 0.14' \text{ N.}$

A repetition of the reckoning is only required for the hour angle

$$\begin{aligned} p_{61} &= 60.52; p_2 - p_1 = 4.55. \\ \text{Therefore, } \frac{a_1 - a_2}{2} &= \frac{1}{4} \left[\frac{60.52 \ 120}{59.53} - \frac{4.55 \ 59.53}{60.52} \right] \\ &= \frac{1}{4} (122.00 - 4.48) \\ &= 29.38^m \text{ E.} \\ 24^h &0.00 \end{aligned}$$

Apparent time at the middle of observ'ns 23^h 30.62^m

When only the greatest altitude is observed the reduction may be found by formula (5^a) in which $\frac{u}{2a_0}$ represents the

rate of speed per time minute. The hour angle is approximately $\frac{p_0}{2} \left[\frac{u}{2a_0} \right]$, but of little use as the exact time when

the greatest altitude occurs, cannot be noted by watch, and consequently the exact corresponding Greenwich time by chronometer and the longitude cannot be found.

The method of equal altitudes explained above is of great practical value, because results can easily be verified by using the actual hour angles of the observed altitudes for finding latitude. For instance, in the preceding example:

$$\frac{a_1 - a_2}{2} = 29.38$$

$$\text{and } \frac{a_1 + a_2}{2} = 59.53$$

$$\text{consequently } a_1 = 88.91$$

$$\text{and } a_2 = 30.15$$

$$\text{As } p_{62} = 62.86, \text{ according to formula (1) } t^2 = 30.15^2$$

$$\text{the correction } y = \frac{p}{t^2} = \frac{62.86}{30.15^2} = 14.46$$

$$\text{Observed true altitude } 17^\circ 45.72$$

$$\text{Alt. reduced to mer. } 18^\circ 0.18$$

$$\text{Meridian Z. D. } = 71^\circ 59.82 \text{ N.}$$

$$\text{Declination } 10^\circ 0.00 \text{ S.}$$

$$\text{Lat. at second observ. } 61^\circ 59.82 \text{ N.}$$

$$\text{minus half the diff. of lat. } 1^\circ 0.00$$

$$\text{Lat. at middle of observ's } 60^\circ 59.82 \text{ N.}$$

which very well agrees with the result obtained above.

For verification it is always best to use the observation nearest the meridian, that is, the least hour angle.

The errors of the official method in use are now easily ascertained with the assistance of the formulæ given above. In finding the reduction of the observed altitude to the meridian, the official method neglects the correction of the elapsed time for difference of longitude, which is equivalent to using a in formula (3) for a_0 , a representing half the uncorrected elapsed time. In other words, if x denotes the difference between a_0 and a , $a_0 - x$ is used instead of a_0 , x being positive for easterly and negative for westerly courses; therefore the error in the reduction equals:

$$\frac{a_0}{2a_0} \frac{(a_0 - x)^2}{x} = \frac{p_0}{2a_0} \frac{x}{x^2} = \frac{p_0}{2a_0} \frac{1}{x}$$

This quantity or error, equivalent to an error with opposite sign in latitude, increases as the difference in longitude increases and as the latitude decreases; on and near the equator the error reaches infinity.

Furthermore, the official method neglects the reduction of the greatest altitude to the meridian, whether the greatest altitude is found directly by observation or indirectly from an altitude near the meridian. This quantity or error in altitude, according to formula (5), equals $\frac{s^2}{p_0}$, s representing

the hour angle of the greatest altitude. Therefore, as the errors in altitude affect the latitude in an opposite way,

$$\text{the error total in latitude} = -\frac{x(2a_0 - x) + s^2}{p_0}$$

This quantity is to be added algebraically to the latitude in by the method in use in order to obtain the correct latitude.

The official method takes the middle of the elapsed time for the moment of transit of the object, whereas it is the moment when the greatest altitude occurs, and, therefore, the hour angle of the latter equals the error in longitude by the official method in use. According to formula (4) this

$$\text{Error in longitude} = \frac{1}{4} \left[\frac{p_0 u}{a_0} - \frac{(p_2 - p_1) a_0}{p_0} \right]$$

To get an idea of the magnitude of all the errors of the method in use, barring errors by observation, the following tables are appended:

TABLE 1.

Showing the error in latitude in arc minutes, on easterly and westerly courses, on account of neglecting the change in longitude when the declination is zero, and half the corrected elapsed time equals one hour.

Latitude, Degrees.	RATE OF SPEED PER HOUR, MILES.							
	40		30		20		10	
	East.	West	East.	West	East.	West	East.	West
10	-58.99	61.71	-43.91	46.63	-28.82	31.54	-13.73	16.45
20	-29.91	31.37	-22.25	23.71	-14.59	16.05	-6.93	8.39
30	-20.41	21.49	-15.18	16.26	-9.94	11.02	-4.70	5.78
40	-15.82	16.76	-11.75	12.69	-7.68	8.62	-3.60	4.54
50	-13.17	14.11	-9.76	10.70	-6.35	7.29	-2.94	3.88
60	-11.55	12.63	-8.53	9.61	-5.51	6.59	-2.48	3.56
70	-10.42	11.87	-7.65	9.09	-4.86	6.30	-2.07	3.51
80	-9.29	12.03	-6.63	9.37	-3.96	6.70	-1.30	4.04

To find the error for any other declination, multiply table value by tangent latitude and divide the product by tangent latitude minus or plus tangent declination; minus when latitude and declination are of the same name, otherwise plus.

TABLE 2.

Showing the error in latitude in arc minutes and the approximate error in longitude in time minutes, on account of neglecting the hour angle of the greatest altitude respectively its reduction to the meridian, when the declination is zero.

Latitude, Degrees.	ERROR IN LATITUDE.				ERROR IN LONGITUDE.				Latitude, Degrees.
	Rate of Speed per Hour, Miles.				Rate of Speed per hour, Miles.				
	40	30	20	10	10	20	30	40	
10	— 0.60	— 0.34	— 0.15	— 0.04	0.45	0.90	1.35	1.80	10
20	— 1.24	— 0.70	— 0.31	— 0.08	0.93	1.85	2.78	3.71	20
30	— 1.96	— 1.10	— 0.49	— 0.12	1.47	2.94	4.41	5.88	30
40	— 2.85	— 1.60	— 0.71	— 0.18	2.14	4.27	6.41	8.55	40
50	— 4.05	— 2.27	— 1.01	— 0.25	3.04	6.07	9.11	12.14	50
60	— 5.88	— 3.31	— 1.47	— 0.37	4.41	8.82	13.23	17.64	60
70	— 9.33	— 5.25	— 2.33	— 0.58	7.00	13.99	20.99	27.99	70
80	— 19.26	— 10.83	— 4.82	— 1.21	14.44	28.88	43.33	57.77	80

To find the errors in latitude and longitude for any other declination by table 2, multiply table value by tangent latitude minus or plus tangent declination, minus when latitude and declination are of the same name, otherwise plus, and divide the product by tangent latitude.

The hour angle is positive when the latitude decreases, and negative (east) when the latitude increases, and the longitude is affected accordingly; an eastern hour angle renders the longitude more westerly, a western hour angle more easterly, than by the method in use.

JOHN MAURICE,
Civil Engineer and Nautical Expert.

Chicago, October, 1900.

VISIBLE SUPPLY OF GRAIN.

As compiled for THE MARINE RECORD, by George F. Stone, Secretary Chicago Board of Trade.

CITIES WHERE STORED.	WHEAT. Bushels.	CORN. Bushels.	OATS. Bushels.	RYE. Bushels.	BARLEY. Bushels.
Buffalo.....	2,940,000	167,000	401,000	91,000	922,000
Chicago.....	13,008,000	1,796,000	3,470,000	538,000	62,000
Detroit.....	518,000	54,000	163,000	50,000	20,000
Duluth.....	6,728,000	65,000	350,000	124,000	902,000
Fort William, Ont.....	970,000				
Milwaukee.....	829,000	126,000	487,000	6,000	50,000
Port Arthur, Ont.....	93,000				
Toledo.....	1,281,000	403,000	1,473,000	24,000	24,000
Toronto.....	80,000		2,000		172,000
On Canals.....	241,000	267,000	73,000		453,000
On Lakes.....	937,000	2,362,000	998,000	53,000	261,000
On Miss. River.....					
Grand Total.....	60,032,000	7,983,000	12,986,000	1,100,000	3,611,000
Corresponding Date, 1899.....	51,001,000	12,832,000	6,963,000	1,127,000	3,358,000
Increase.....	259,000		450,000	50,000	544,000
Decrease.....		161,000			

While the stock of grain at lake ports only is here given, the total shows the figures for the entire country except the Pacific Slope.

Bids for the five battleships and six armored cruisers will be opened at the Navy Department, Dec. 7. There will be an unusual amount of activity in the bidding this year, as there are several new competitors in the field. On the Pacific coast the Union Iron Works will this year have for a competitor the Driscoll Steel Co., and in the East there will be three new bidders on the large vessels. The construction of these ships constitutes the largest ship-building program ever laid down by the Navy Department.

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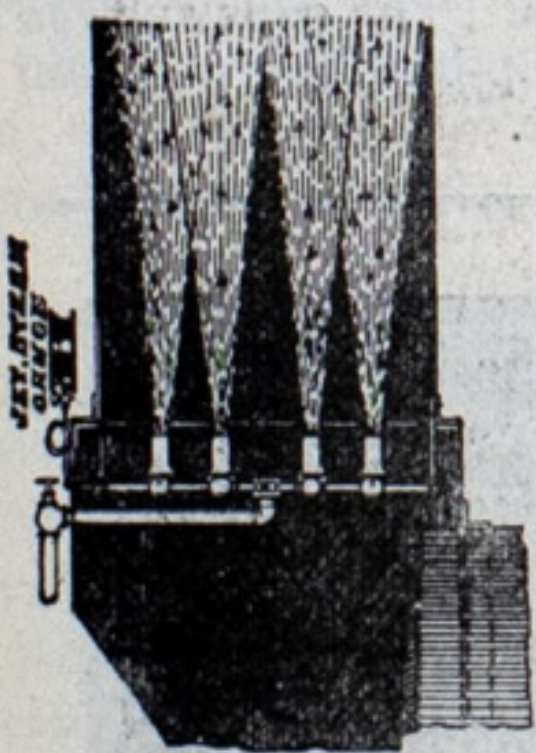
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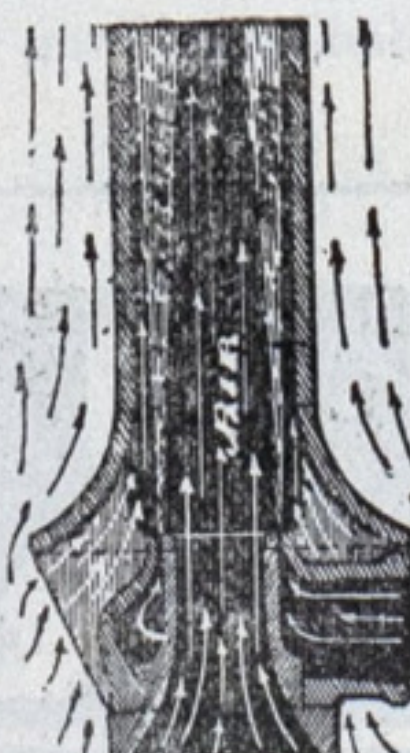
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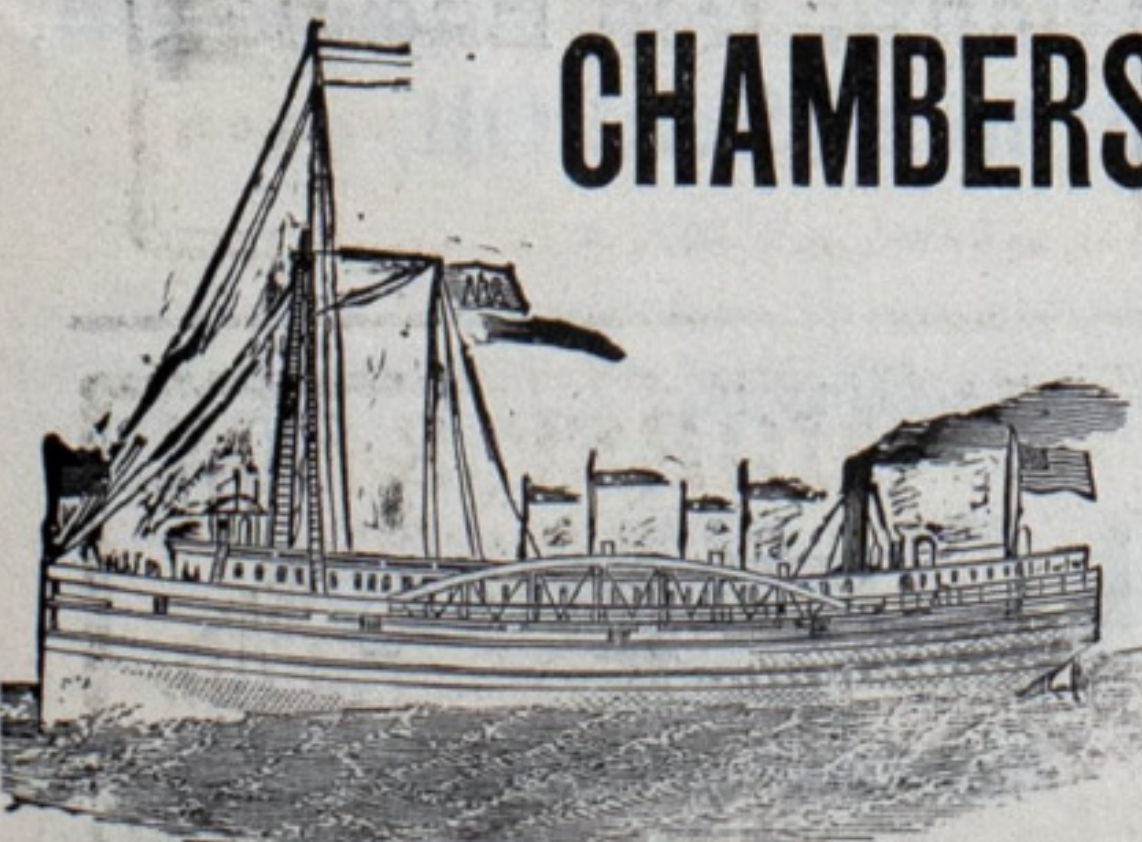
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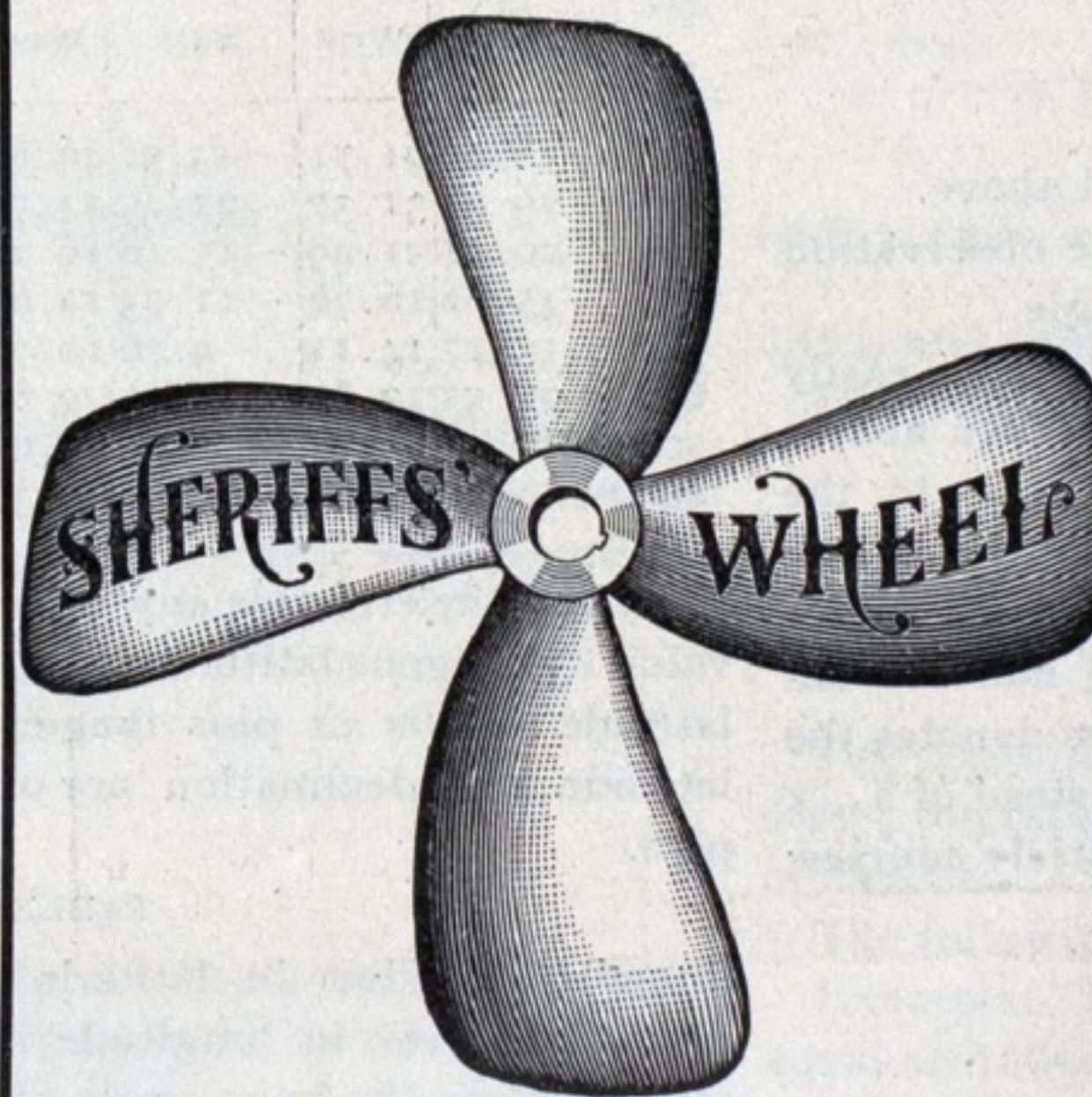
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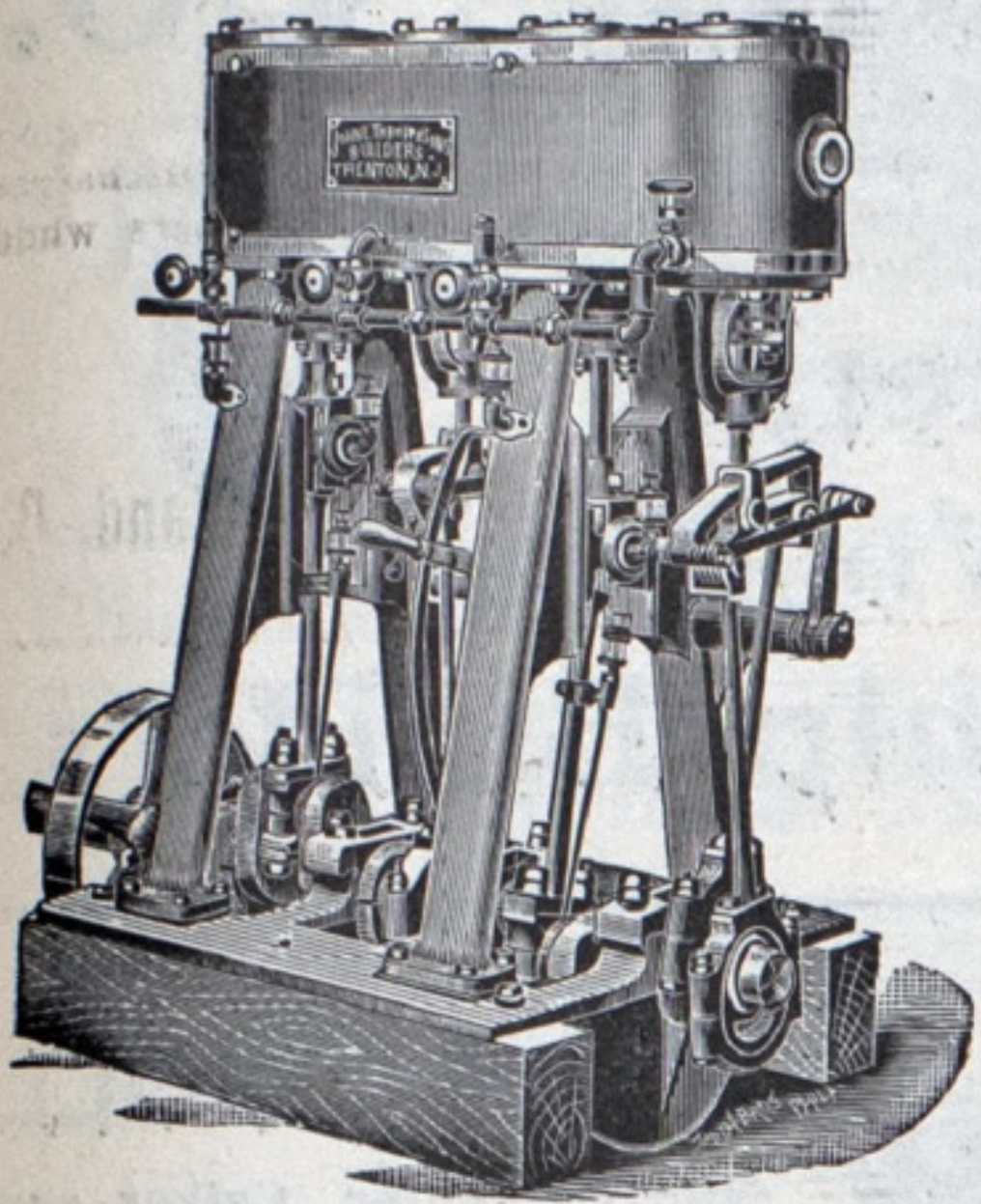
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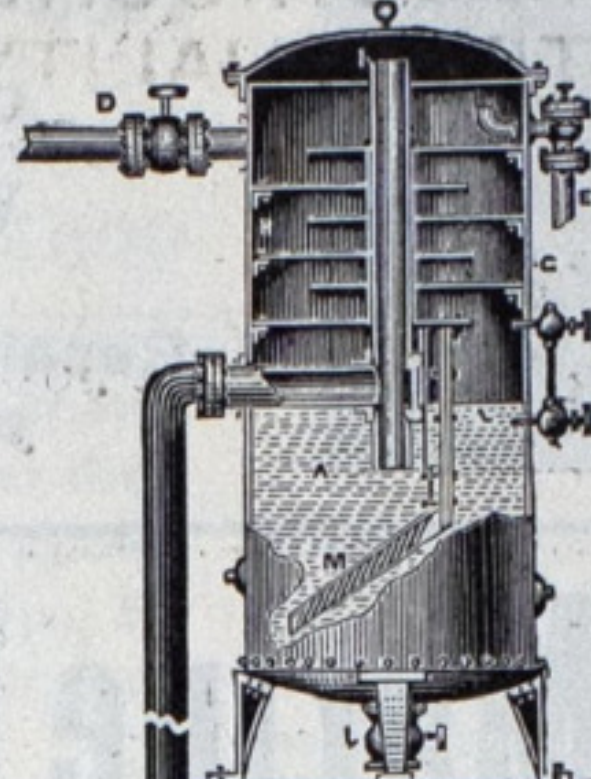
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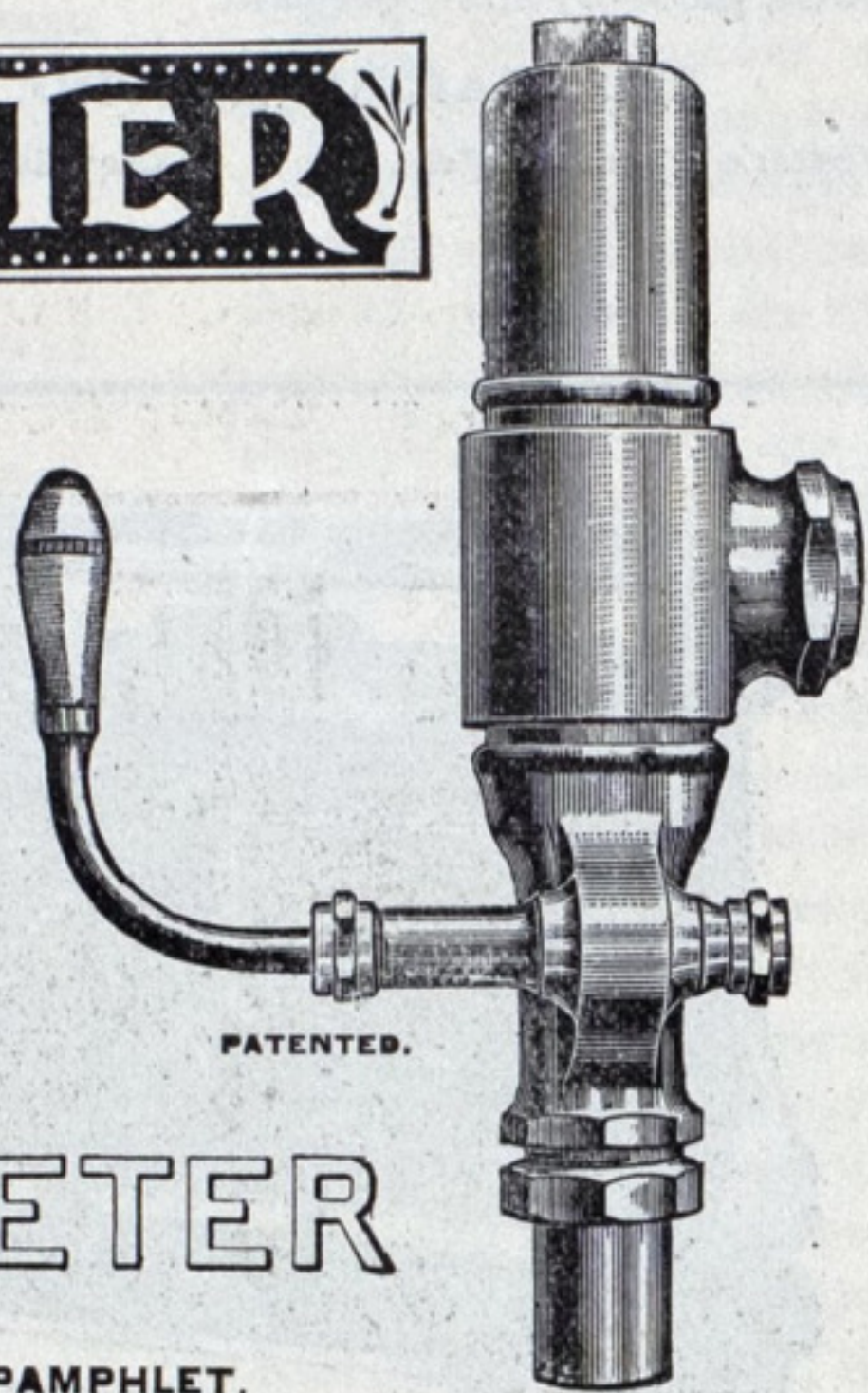
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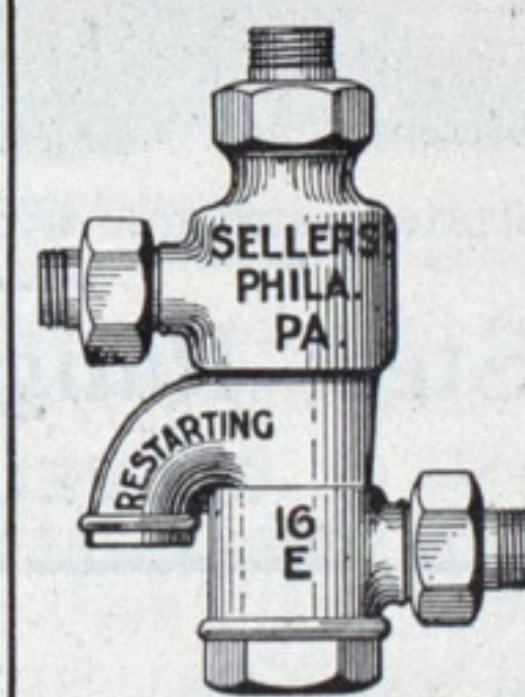


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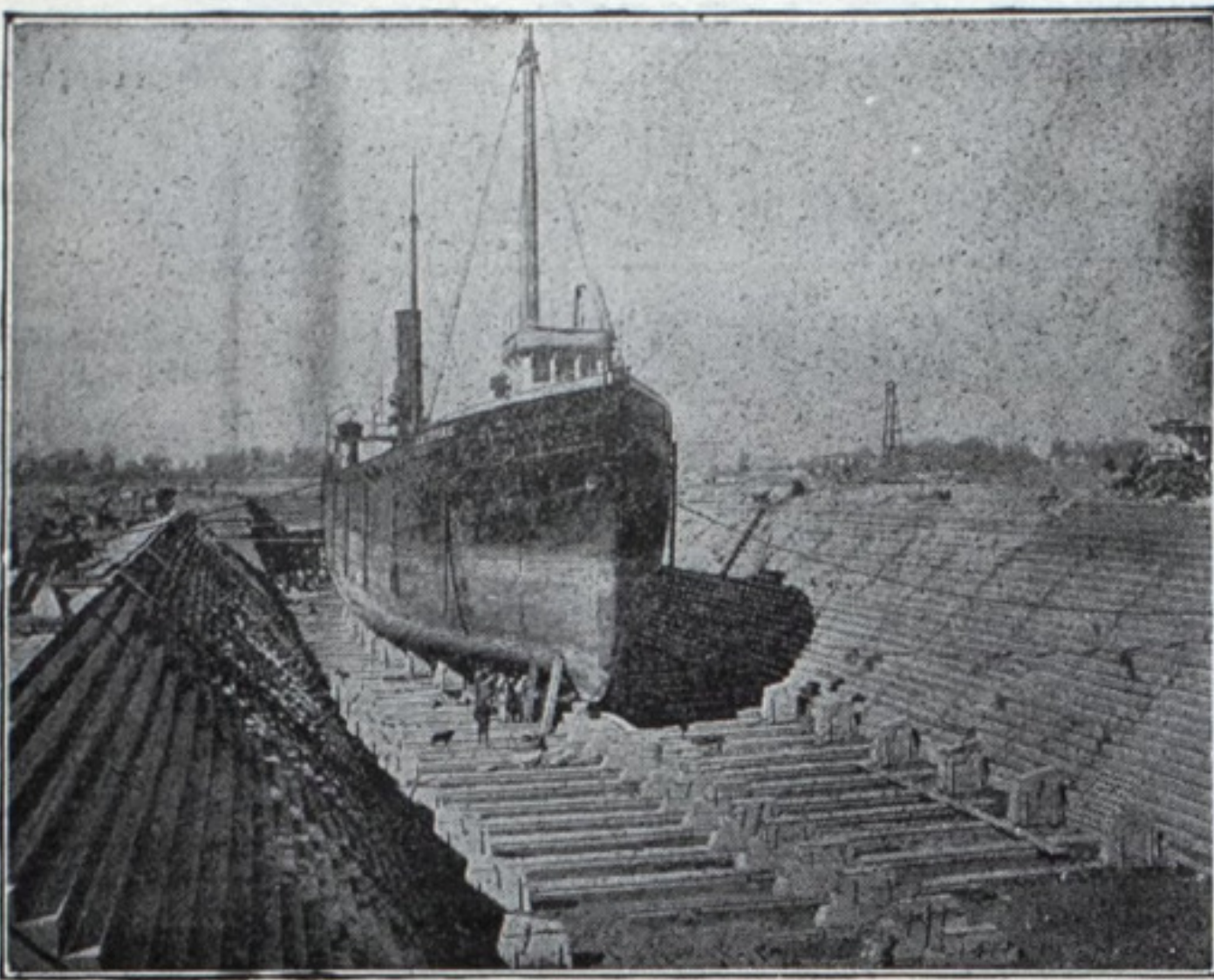
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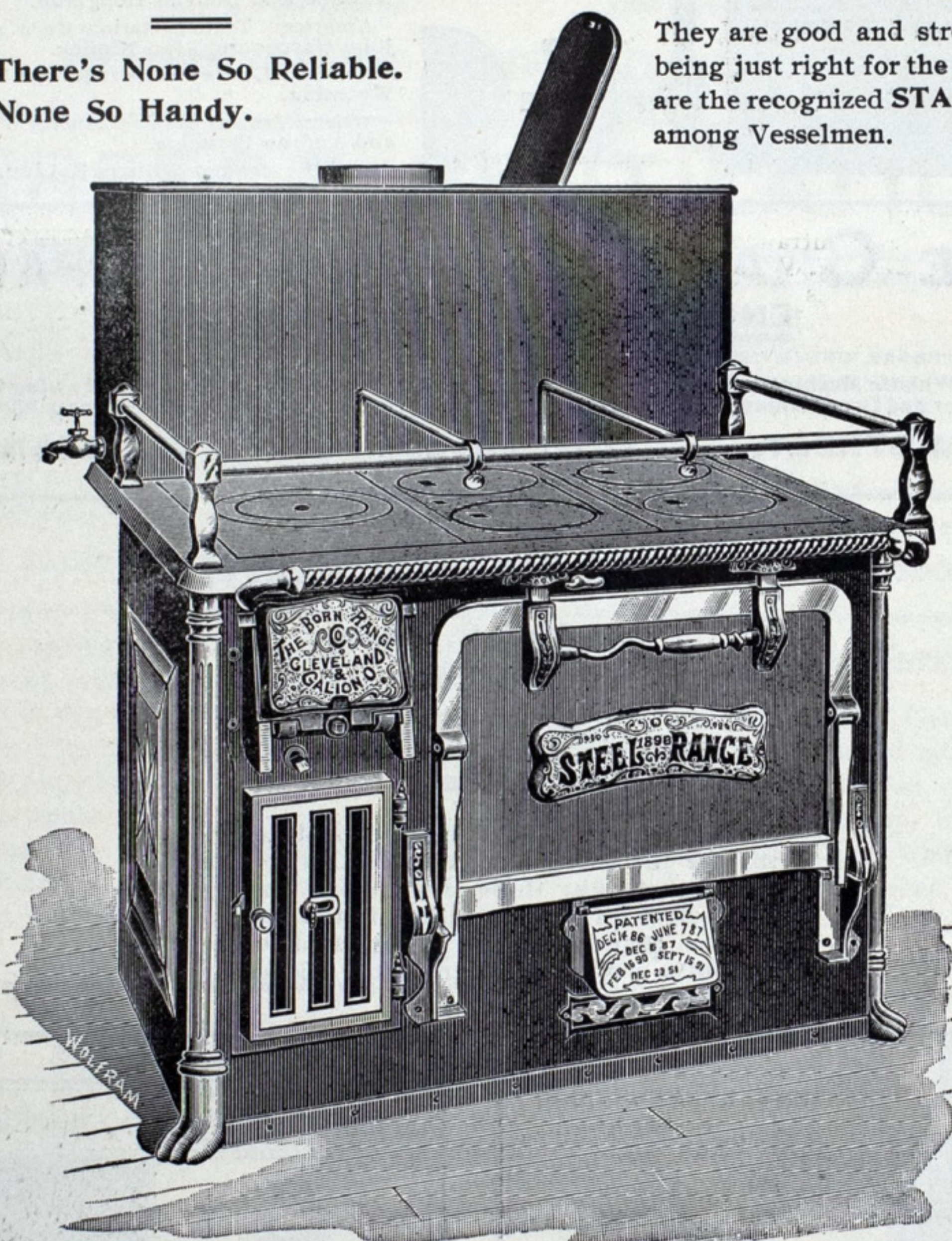
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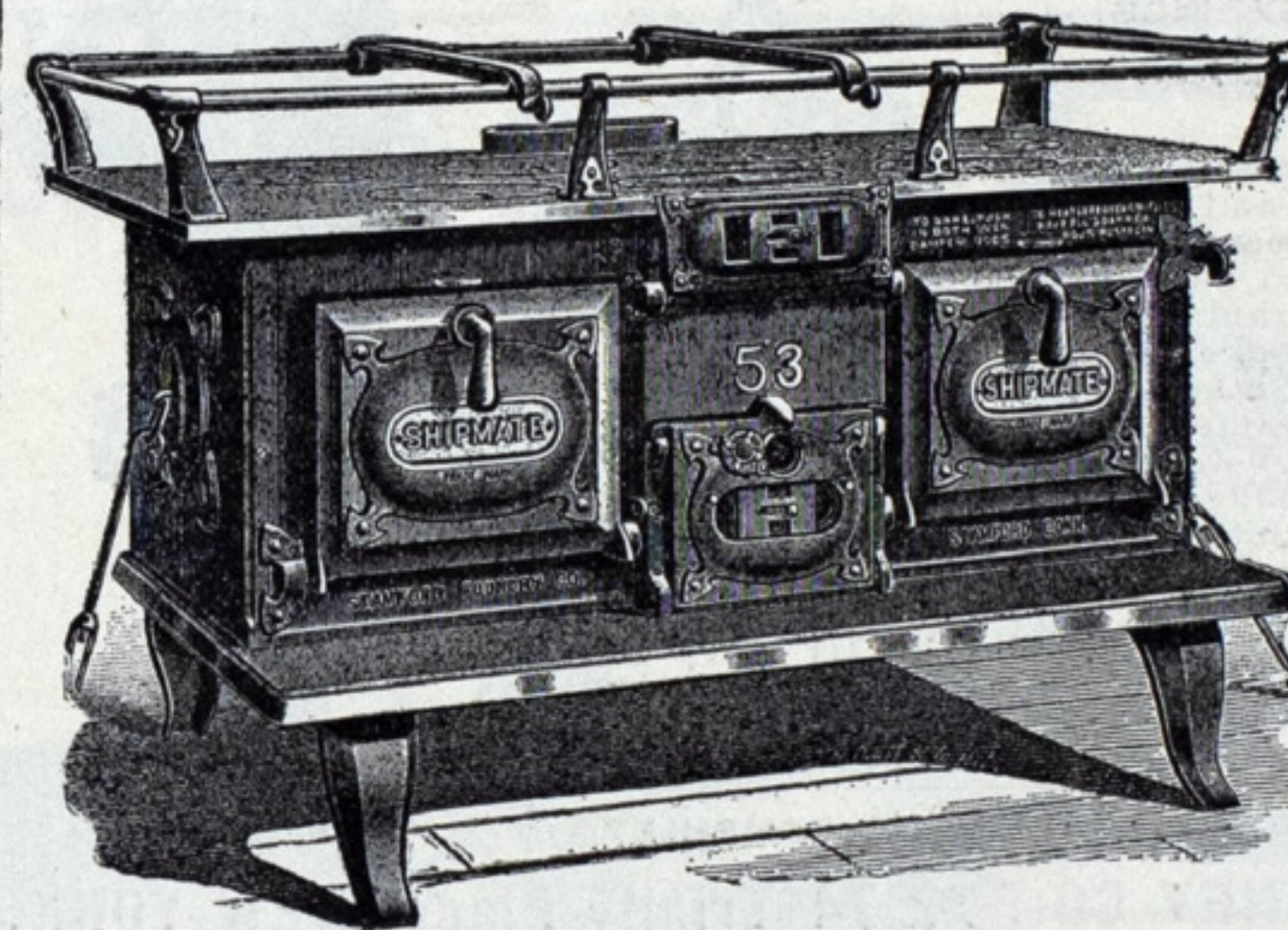
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